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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	8535-026-999	*Total Pages*	376
First Named Inventor or Application Identifier			
Michael Nehls			
Express Mail Label No.	EL 452 480 100 US		

jc584 U.S. PTO 09/398253 09/17/99

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: **Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231**

1. ☒ Fee Transmittal Form
   Submit an original, and a duplicate for fee processing)
2. ☒ Specification [84 pages]
   (preferred arrangement set forth below)
   - -Descriptive title of the Invention
   - -Cross Reference to Related Applications
   - -Statement Regarding Fed sponsored R&D
   - -Reference to Microfiche Appendix
   - -Background of the Invention
   - -Brief Summary of the Invention
   - -Brief Description of the Drawings *(if filed)*
   - -Detailed Description of the Invention (including drawings, *if filed*)
   - -Claim(s)
   - -Abstract of the Disclosure
3. ☒ Drawing(s) *(35 USC 113)* [1 page]
4. ☒ Oath or Declaration (unexecuted) [2 pages]
   - a. ☐ Newly executed (original or copy)
   - b. ☐ Copy from a prior application (37 CFR 1.63(d))
     (for continuation/divisional with Box 17 completed)
     [Note Box 5 below]
     - i. ☐ DELETION OF INVENTORS(S)
       Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33 (b).
5. ☐ Incorporation By Reference *(useable if Box 4b is checked)*
   The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program *(Appendix)*
7. ☒ Nucleotide and/or Amino Acid Sequence Submission
   (if applicable, all necessary)
   - a. ☐ Computer Readable Copy
   - b. ☒ Paper Copy (287 pages)
   - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers
9. ☐ 37 CFR 3.73(b) Statement *(when there is an assignee)* ☒ Power of Attorney (unexecuted)
10. ☐ English Translation Document *(if applicable)*
11. Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503)
    (Should be specifically itemized)
14. ☒ Small Entity Statement(s) ☐ Statement filed in prior application, Status still proper and desired
15. ☐ Certified Copy of Priority Document(s)
    (if foreign priority is claimed)
16. ☐ Other:

17. If a CONTINUING APPLICATION, *check appropriate box and supply the requisite information:*
☐ Continuation ☐ Divisional ☒ Continuation-in-part (CIP) of prior Provisional Application No: 60/095,989

18. CORRESPONDENCE ADDRESS

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ATTORNEY DOCKET NO. 8535-026-999

Date: September 17, 1999

Assistant Commissioner for Patents
Box PATENT APPLICATION
Washington, D.C. 20231

Sir:

The following utility patent application is enclosed for filing:

Applicant(s): Nehls *et al.*

Executed on: Unexecuted

Title of Invention: **NOVEL HUMAN POLYNUCLEOTIDES AND POLYPEPTIDES ENCODED THEREBY**

PATENT APPLICATION FEE VALUE

TYPE	NO. FILED	LESS	EXTRA	EXTRA RATE	FEE
Total Claims	9	-20	0	$18.00 each	$ 0.00
Independent	4	-3	1	$78.00 each	$ 78.00
				Minimum Fee	$ 760.00
				Multiple Dependency Fee If Applicable ($260.00)	$ 0.00
				Total	$ 838.00
				50% Reduction for Independent Inventor, Nonprofit Organization or Small Business Concern (a verified statement as to the applicant's status is attached)	- $ 419.00
				Total Filing Fee	$ 419.00

☒ Priority of application no. 60/100,917 filed on September 17, 1998 is claimed under 35 U.S.C. § 119.

A copy of this sheet is enclosed.

Respectfully submitted,

by Norbert Stahl
Reg. No. 44,350

Laura Coruzzi

30,742

Laura A. Coruzzi (Reg. No.)
PENNIE & EDMONDS LLP

Enclosure

This form is not for use with continuation, divisional, re-issue, design or plant patent applications.

CA1 - 226998.1

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STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(c)) -- SMALL BUSINESS CONCERN

Docket Number (Optional)
8535-026-999

Applicant, Patentee, or Identifier: Michael Nehls et al.
Application or Patent No.: to be assigned
Filed or Issued: concurrently herewith
Title: Novel Human Polynucleotides & Polypeptides Encoded Thereby

I hereby state that I am
☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN Lexicon Genetics Incorporated

ADDRESS OF SMALL BUSINESS CONCERN 4000 Research Forest Dr., The Woodlands, TX 77381

I hereby state that the above identified small business concern qualifies as a small business concern as defined in 13 CFR Part 121 for purposes of paying reduced fees to the United States Patent and Trademark Office. Questions related to size standards for a small business concern may be directed to: Small Business Administration, Size Standards Staff, 409 Third Street, SW, Washington, DC 20416.

I hereby state that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

☒ the specification filed herewith with title as listed above.
☐ the application identified above.
☐ the patent identified above.

If the rights held by the above identified small business concern are not exclusive, each individual, concern, or organization having rights in the invention must file separate statements as to their status as small entities, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

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I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

NAME OF PERSON SIGNING Arthur T. Sands

TITLE OF PERSON IF OTHER THAN OWNER President & CEO

ADDRESS OF PERSON SIGNING 4000 Research Forest Drive, The Woodlands, TX 77381

SIGNATURE Arthur Sands   DATE September 14, 1999

NOVEL HUMAN POLYNUCLEOTIDES AND THE POLYPEPTIDES ENCODED THEREBY

1. FIELD OF THE INVENTION

The present invention is in the field of molecular genetics. The application discloses novel nucleic acid sequences that partially define the scope of human exons that can be trapped and identified by the disclosed vectors/methods, and which are useful, *inter alia*, for identifying the organization of the coding regions and of the human genome.

2. BACKGROUND OF THE INVENTION

The Human Genome Project and privately financed ventures are currently sequencing the human genome, and the substantial completion of this milestone is expected before the year 2003. The hope is that, at the conclusion of the sequencing phase, a comprehensive representation of the human genome will be available for biomedical analysis. However, the data resulting from such efforts will largely comprise human genomic sequence of which only a fraction actually encodes expressed sequence information. Although sophisticated computer-assisted exon identification programs can be applied to such genomic sequence data, the computer predictions require verification by laboratory analysis to actually identify the coding regions of the genome. Consequently, the availability of cDNA information will significantly contribute to the value of the human genomic sequence since cDNA sequence provides a direct indication of the presence of transcribed sequences as well as the location of splice junctions. Thus, the sequencing of cDNA libraries to obtain expressed sequence tags (or ESTs) that identify exons expressed within a given tissue, cell, or cell line is currently in progress. As a consequence of these efforts, a large number of EST sequences are presently compiled in public and privately held databases. However, the present EST paradigm is inherently limited by the levels and extent of mRNA production within a given cell. A related problem is the lack of cDNA sources from specific tissue and developmental expression profiles. In addition, some genes are typically only active under certain physiological conditions or are generally expressed at levels below or near the threshold necessary for cDNA cloning and detection and are therefore not effectively represented in current cDNA libraries.

Researchers have partially addressed these issues by using phage vectors to clone genomic sequences such that internal exons are trapped (Nehls, *et al.*, 1994, Current Biology, *4(1)*:983-989, and Nehls, *et al.*, 1994, Oncogene, *9*:2169-2175). However, such libraries require the random cloning of genomic DNA into a suitable cloning vector *in vitro*, followed by reintroduction of the cloned DNA *in vivo* in order to express and splice the cloned genes prior to producing the cDNA library. Additionally, such methods can only "trap" the internal exons of genes. Consequently, genes containing a single exon or a single intron are typically not trapped by traditional methods of exon trapping.

3. SUMMARY OF THE INVENTION

The subject invention provides numerous isolated and purified novel human cDNAs produced using gene trap technology. The novel human gene trapped sequences (GTSs) of the subject invention are disclosed as SEQ ID NOS:9-1008 in the appended Sequence Listing.

The subject invention further contemplates the use of one or more of the subject GTSs, or portions thereof, to isolate cDNAs, genomic clones, or full-length genes/polynucleotides, or homologs, heterologs, paralogs, or orthologs thereof, that are capable of hybridizing to one or more of the disclosed GTSs or their complementary sequences under stringent conditions.

The subject invention additionally contemplates methods of analyzing biopolymer (*e.g.*, oligonucleotides, polynucleotides, oligopeptides, peptides, polypeptides, proteins, etc.) sequence information comprising the steps of loading a first biopolymer sequence into or onto an electronic data storage medium (*e.g.*, digital or analogue versions of electronic, magnetic, or optical memory, and the like) and comparing said first sequence to at least a portion of one of the polynucleotide sequences, or amino acid sequence encoded thereby, that is first disclosed in, or otherwise unique to, SEQ ID NOS:9-1008. Typically, the polynucleotide sequences, or amino acid sequences encoded thereby, will also be present on, or loaded into or onto a form of electronic data storage medium, or transferred therefrom, concurrent with or prior to comparison with the first polynucleotide.

Another embodiment of the invention is the use of a oligonucleotide or polynucleotide sequence first disclosed in at least a portion of at least one of the GTS sequences of SEQ ID NOS:9-1008 as a hybridization probe. Of particular interest is the use of such sequences in conjunction with a solid support matrix/substrate (resins, beads, membranes, plastics, polymers, metal or metallized substrates, crystalline or polycrystalline substrates, etc.). Of particular note are spatially addressable arrays (*i.e.*, gene chips, microtiter plates, etc.) of polynucleotides wherein at least one of the polynucleotides on the spatially addressable array comprises an oligonucleotide or polynucleotide sequence first disclosed in at least one of the GTS sequences of SEQ ID NOS:9-1008.

Similarly, one or more oligonucleotide probes based on, or otherwise incorporating, sequences first disclosed in any one of SEQ ID NOS:9-1008, can be used in methods of obtaining novel gene sequence via the polymerase chain reaction or by cycle sequencing. Similar oligonucleotide hybridization probes can also comprise sequence that is complementary to a portion of a sequence that is first disclosed in, or preferably unique to, at least one of the GTS polynucleotides in the sequence listing. The oligonucleotide probes will generally comprise between about 8 nucleotides and about 80 nucleotides, preferably between about 15 and about 40 nucleotides, and more preferably between about 20 and about 35 nucleotides.

Moreover, an oligonucleotide or polynucleotide sequence first disclosed in at least one of the GTS sequences of SEQ ID NOS:9-1008 can be incorporated into a phage display system that can be used to screen for proteins, or other ligands, that are capable of binding an amino acid sequence encoded by an oligonucleotide or polynucleotide sequence first disclosed in at least one of the GTS sequences of SEQ ID NOS:9-1008.

An additional embodiment of the present invention is a library comprising individually isolated linear DNA molecules corresponding to at least a portion of the described human GTSs which are useful for synthesizing physically contiguous sequences of overlapping GTSs by, for example, the polymerase chain reaction (PCR).

The subject invention also provides for an antisense molecule which comprises at least a portion of sequence that is first disclosed in, or preferably unique to, at least one of the GTS polynucleotides.

The subject invention also contemplates a purified polypeptide in which at least a portion of the polypeptide is encoded by, and thus first disclosed by, at least a portion of a GTS of the present invention. The invention also relates to naturally occurring polynucleotides comprising the disclosed GTSs that are expressed by promoter elements other than the promoter elements that normally express the GTSs in human cells (*i.e.*, gene activated GTSs). Such promoter elements can be directly incorporated into the cellular genome or recombinantly engineered upstream from at least a portion of a GTS (preferably at least about 50, more preferably at least about 75, and most preferably at least about 100 to 130 base in length) of the present invention, or a complement thereof. A particularly preferred embodiment includes recombinantly engineered expression vectors that similarly have or incorporate at least a, preferably unique, portion of the disclosed GTSs or complement thereof.

4. DESCRIPTION OF THE SEQUENCE LISTING AND FIGURES

The Sequence Listing is a compilation of nucleotide sequences obtained by sequencing a human gene trap library that at least partially identifies the genes in the target cell genome that can be trapped by the described gene trap vectors (*i.e.*, the repertoire of genes that are active or have not been inactivated).

Figures 1A-1D. Figure 1A illustrates a retroviral vector that can be used to practice the described invention. Figure 1B shows a schematic of how a typical cellular genomic locus is effected by the integration of the retroviral construct into intronic sequences of the cellular gene. Figure 1C shows the chimeric transcripts produced by the gene trap event as well as the locations of the binding sites for PCR primers. Figure 1D shows how the PCR amplified cDNAs are directionally cloned into a suitable GTS vector.

5. DETAILED DESCRIPTION OF THE INVENTION

The present invention is directed to novel human polynucleotide sequences obtained from cDNA libraries generated by the normalized expression of genomic exons using gene trap technology. In particular, the disclosed novel polynucleotides were generated using a modified reverse-orientation retroviral gene trap vector that was nonspecifically integrated

into the target cell genome, although other polynucleotide (DNA or RNA) gene trap vectors could have been introduced to the target cells by, for example, transfection, electroporation, or retrotransposition. Preferred retroviral vectors that can be used to practice the present invention (as well as methods and recombinant tools for making and using the described GTSs) are disclosed in, *inter alia*, U.S. Application Ser. No. 09/276,533, filed March 25, 1999 which is herein incorporated by reference in its entirety.

After integration, the exogenous promoter of the sequence acquisition, or 3' gene trap, component of the vector was used to express and splice a chimeric mRNA that was subsequently reverse transcribed, amplified, and subject to DNA sequence analysis. Unlike conventional cDNA libraries, the presently disclosed libraries are largely unaffected by the bias inherent in cDNA libraries that rely solely on endogenous mRNA expression. Additionally, by integrating a vector into the target cell genes, a chimeric mRNA is produced that allows for the specific expansion and isolation of cDNAs corresponding to the chimeric mRNAs using vector specific primers.

As used herein the term "gene trapped sequence", or "GTS", refers to nucleotide sequences that correspond to naturally occurring endogenously encoded human exons that have been expressed as part of a chimeric "gene trapped" mRNA. Typically, the chimeric mRNA incorporates at least a portion of sequence that has been engineered into the sequence acquisition exon of a gene trap vector which, *inter alia*, facilitates cDNA production by reverse transcriptase and amplification of the cDNA by PCR to produce an isolated linear DNA molecule. The disclosed GTSs do not include vector encoded sequences.

The term "GTS" not only refers to polynucleotides that are exactly complementary to naturally occurring human mRNA, but also refers to "GTS derivatives". The term "GTS derivative" also refers to heterologs, paralogs, orthologs, and allelic variants of the specific GTSs described herein. In addition, a GTS may include the complete coding region for a naturally occurring peptide or polypeptide. A GTS may also include a complete open reading frame.

The term "GTS peptide" as used herein includes oligopeptides or polypeptides sharing biological activity and/or immunogenicity (or immunological cross-reactivity) with an amino

acid sequence encoded by at least one of the disclosed GTSs or complement thereof. The terms "biological activity" (or "biological characteristics") of a polypeptide refers to the structural or biochemical function of the polypeptide in the normal biological processes of the organism in which the polypeptide naturally occurs. Examples of such characteristics include protein structure and/or conformation, which can be determined biochemically by reaction with appropriate ligands or receptors or by suitable biological assays.

A GTS peptide may also correspond to a full-length naturally occurring peptide or polypeptide. GTS peptides can have amino acid sequences that directly correspond to naturally occurring polypeptides or amino acid sequences or can comprise minor variations. Such variations can include amino acid substitutions that are the result of the replacement of one amino acid with another amino acid having a similar structural and/or chemical properties, such as the substitution of a leucine with an isoleucine or valine, an aspartate with a glutamate, or a threonine with a serine, *i.e.*, conservative amino acid replacements. Additional variations include minor amino acid deletions and/or insertions, typically in the range of about 1 to 6 amino acids, and can also include one or more amino acid substitutions. Guidance in determining which GTS peptide amino acid residues can be replaced or deleted without abolishing the biological activity of interest may be determined empirically, or by using computer amino acid sequence databases to identify polypeptides that are homologous to a given GTS peptide and trying to avoid amino acid substitutions in conserved regions of homology.

"Homology" refers to the similarity or the degree of similarity between a reference, or known polynucleotide and/or polypeptide and a test nucleotide sequence and/or its corresponding amino acid sequence. As used herein, "homology" is defined by sequence similarity between a reference sequence and at least a portion of the newly sequenced nucleotide. Typically, a corresponding amino acid sequence similarity should exist between the peptides encoded by such homologous sequences.

To determine whether proteins are homologous, the GTS sequence is translated into the corresponding amino acid sequence. The amino acid sequence is then compared with reference polypeptide sequences. A short string of matching amino acid sequence can constitute good evidence of homology (for example, repeating Gly-Pro-X sequence, or the

presence of an RGD motif). However, typically a larger number of similar amino acids is required to label two sequences homologous. Generally, the match needs to be at least about 7 or 8 amino acids, among which perhaps one mismatch is allowed. These criteria allow good sensitivity in finding all relevant sequences while providing a threshold amount of selectivity.

After peptide homology has been found, the respective nucleotide sequences are compared. An alignment of the reference and new sequences should show at least about 60%, and preferably at least about 65%, agreement over the minimum of 21 nucleotides which correspond to the 6 matching amino acids. Generally, a low percentage of agreement is acceptable if the differences are in the "wobble" position (or third nucleotide of the triplet coding for an amino acid).

As used herein, a "mutated" polypeptide has an altered primary structure typically resulting from corresponding mutations in the nucleotide sequence encoding the protein or polypeptide. As such, the term "mutated" polypeptides can include allelic variants. Mutational changes in the primary structure of a polypeptide result from deletions, additions or substitutions. A "deletion" is defined as a change in a polypeptide sequence in which one or more internal amino acid residues are absent. An "addition" is defined as a change in a polypeptide sequence which has resulted in one or more additional internal amino acid residues as compared to the wild type. A "substitution" results from the replacement of one or more amino acid residues by other residues. A polypeptide "fragment" is a polypeptide consisting of a primary amino acid sequence which is identical to a portion of the primary sequence of the polypeptide to which the polypeptide is related.

A host cell "expresses" a gene or DNA when the gene or DNA is transcribed into RNA that may optionally be translated to produce a polypeptide.

The subject invention also includes GTSs which are incorporated into expression vectors and transformed into host cells which subsequently express the polynucleotides and/or polypeptides encoded by the GTSs.

The subject invention also includes antibodies capable of specifically binding to GTS peptides, as well as methods of detecting a GTS peptides or the corresponding protein by

combining a sample for analysis with an antibody capable of specifically binding to a GTS peptide and detecting the formation of antibody complexes present in the sample.

The subject invention also includes a method of isolating a GTS peptide, or its corresponding protein comprising the step of separating the GTS peptide, or its corresponding protein, from a solution utilizing an antibody capable of specifically binding to the GTS peptide or its corresponding protein.

The subject invention also provides for markers for use in detecting diseases, biological events, cell types and tissues which comprise at least a portion of a GTS sequence.

Further, the subject invention provides polynucleotide markers useful for physical and genetic mapping of the human, and/or certain model organism, genome(s). In particular, the nucleotide sequences in the Sequence Listing provide sequence tagged sites (STS), that will be useful in completing an STS-based physical map of the human genome, a goal of the human genome project (Collins, F. and Galas, D. (1993) Science *262*:43-46). Additionally, some of these sequences will identify new genes. These new genes will be useful in completing physical and genetic maps of all the genes in the human genome, another goal of the human genome project.

The exons contained in the disclosed GTSs contain open reading frames (present in one of the three reading frames in either orientation of the sequence). Typically, the gene trap strategy employed to generate the GTS sequences allows for the directional cloning and identification of the sense strand. However, it is possible that occasional sequencing errors or random reverse transcription, or PCR aberrations will mask the presence of the appropriate open reading frame. In such cases of sequencing error, it is possible to determine the corresponding GTS sequence by expressing the GTS in an appropriate expression system and determining the amino acid sequence by standard peptide mapping and sequencing techniques (Current Protocols in Molecular Biology, John Wiley & Sons, Vol. 2, Sec 16, 1989). Additionally, the actual reading frame and amino acid sequence of a given nucleotide sequence may be determined by *in vitro* synthesis of a portion of an oligopeptide comprising a possible amino acid sequence and preparing antibodies to the oligopeptide. If the antibodies react with cells from which the GTS of interest was derived, the reading frame is

likely correct. Alternatively, codon usage analysis can be used to track and correct reading frame shifts in gene sequence data.

The correct amino acid sequence of a GTS protein is largely a function of the DNA sequence and the correct amino acid sequence can be readily determined using routine techniques. For example, by providing independent three fold sequencing coverage of the GTS library, random sequencing/RT/PCR errors can be identified and corrected by selecting the sequence represented by the majority of gene trap sequences covering a given nucleotide.

The nucleotide sequences of the Sequence Listing may contain some sequencing errors and several of the nucleotide sequences of the Sequence Listing may contain nucleotides that have not been precisely identified, typically designated by an N, rather than A, T, C, or G. Since each of the nucleotide sequences presented in the Sequence Listing is believed to uniquely identify a novel GTS, any sequencing errors or N's in the nucleotide sequences of the Sequence Listing do not present a problem in practicing the subject invention. Several methods employing standard recombinant methodology, for example, as described in <u>Molecular Cloning: Laboratory Manual 2nd ed.</u>, Sambrook *et al.* (1989), Cold Spring Harbor Laboratory, Cold Spring Harbor, NY (or periodic updates thereof), may be used to correct errors and complete the missing sequence information. For example, a nucleotide and/or oligonucleotide corresponding to a portion of a nucleotide sequence of GTS of interest, can be chemically or biochemically synthesized *in vitro,* and used as a hybridization probe to screen a cDNA library in order to identify and obtain library isolates comprising recombinant DNA sequences containing the GTS cDNA sequence of interest. The library isolate may then be independently subjected to nucleotide sequencing using one or more standard sequencing procedures so as to obtain a complete and accurate nucleotide sequence.

For the purposes of this disclosure, the term "isolated and purified polynucleotide" comprises a polynucleotide purified from a natural cell or tissue as well as polynucleotides which are complementary to the polynucleotides isolated from the natural cell or tissue. One example of an isolated or purified polynucleotide, or a substantially isolated preparation thereof, is a preparation where the polynucleotide of interest represents at least about 80 percent, preferably at least about 85 percent, and more preferably at least about 90 to 95

percent or more of the net product(s) that can be visualized on a DNA agarose gel stained with ethidium bromide.

The described GTSs were obtained from isolates of a cDNA library. Clones isolated from cDNA libraries generated by 3' gene trapping typically contain only a portion of the mature RNA transcript that has been spliced to a vector encoded sequence acquisition exon, and therefore such clones may only encode a portion of the polypeptide of interest (however, it should be appreciated that a number of the disclosed GTSs may encode full- length ORFs). To obtain the remainder of the sequence, the GTSs can be used as hybridization probes to re-screen the same or a different cDNA library, and additional clones isolated by the re-screening can be purified and characterized using standard methods (Benton and Davis, 1977, Science, *196*:180-183). Once sufficiently purified, the size of the DNA insert can be approximated by agarose gel electrophoresis and the larger clones can be analyzed to determine the exact number of bases by DNA sequencing. Frequently, the use of a library different from the one which contained the original clone is useful for this purpose, and particularly a library that has been prepared with extra care to extend cDNA synthesis to full-length, or a library that has been intentionally primed with random primers in order to "jump over" particularly difficult regions of the transcript sequence.

Missing upstream DNA sequence can also be obtained by "primer extension" of the cDNA isolate, a practice common in the art (Sambrook *et al.* (1989), Molecular Cloning: Laboratory Manual 2nd ed. pg 7.79-7.83, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY), whereby a sequence-specific oligonucleotide is used to prime reverse-transcription near the 5'-end of the cDNA clone and the resulting product is either cloned into a bacterial vector or is analyzed directly by DNA sequencing. Finally, newer methods to extend clones in either direction employ oligonucleotide-directed thermocyclic DNA amplification of the missing sequences, wherein a combination of a cDNA-specific primer and a degenerate, vector-specific, or oligo-dT-binding second oligonucleotide can be used to prime strand synthesis. In any of the above methods or other methods of detecting additional cDNA sequence, two or more resulting clones containing the partial cDNA sequence can be recombined to form a single full-length cDNA by standard cloning methods. The resulting

full-length cDNA may subsequently be transferred into any of a number of appropriate expression vectors.

In many instances, the sequencing of clones resulting from independent nonspecific gene trap events will result in a natural redundancy of sequencing more than one cDNA from a particular gene. As discussed above, this feature is a built in form of error detection and correction. These independent gene trap events can also be combined using the various overlapping regions of sequence into an entire contiguous sequence ("contig") containing the complete nucleotide sequence of the full length cDNA. Similar methodology can be used to combine one or more GTSs with one or more publicly available, or proprietary, ESTs to synthesize, electronically or chemically, a contiguous sequence.

The ABI Assembler application, part of the INHERITS DNA analysis system (Applied Biosystems, Inc., Foster City, CA), creates and manages sequence assembly projects by assembling data from selected sequence fragments into a larger sequence. The Assembler combines two advanced computer technologies which maximize the ability to assemble sequenced DNA fragments into Assemblages, a special grouping of data where the relationships between sequences are shown by graphic overlap, alignment and statistical views. The process is based on the Meyers-Kececioglu model of fragment assembly (INHERITS™ Assembler User's Manual, Applied Biosystems, Inc., Foster City, CA), and uses graph theory as the foundation of a very rigorous multiple sequence alignment program for assembling DNA sequence fragments. Additional methods of using GTSs and obtaining full length versions thereof are discussed in U.S. Patent No. 5,817,479, herein incorporated by reference.

It will be appreciated by those skilled in the art that as a result of the degeneracy of the genetic code (see, for example, Table 4-1 at page 109 of "Molecular Cell Biology", 1986, J. Darnell *et al.* eds., Scientific American Books, New York, NY, herein incorporated by reference) a multitude of GTS nucleotide sequences, some bearing minimal nucleotide sequence homology to the nucleotide sequence of genes naturally encoding GTS peptides, can be produced. The invention has specifically contemplated each and every possible variation of nucleotide sequence that could be made by selecting combinations based on possible codon choices. These combinations are made in accordance with the standard triplet

genetic code as applied to the nucleotide sequence of naturally occurring human GTS nucleotide sequences and all such variations are to be considered as being specifically disclosed. Once the triplet codons are "translated" (which can be done electronically) into their amino acid counterparts, the amino acid sequences encoded by the GTS ORFs effectively represent a generic representation of the various nucleotide sequences that can encode the amino acid sequence (*i.e.*, each amino acid is generic for the various nucleotide codons that correspond to that amino acid).

The presently described novel human GTSs provide unique tools for diagnostic gene expression analysis, for cross species hybridization analysis, for genetic manipulations using a variety of techniques, like, for example, antisense inhibition, gene targeting, the identification or generation of full-length cDNA, mapping exons in the human genome, identifying exon splice junctions, gene therapy, gene delivery, chromosome mapping, etc. Furthermore, the expression-based detection and isolation of the described novel polynucleotides verifies that the genes encoding these sequences have not been inactivated by, for example, the covalent modification (methylation, acetylation, glycosylation, etc.) of the target cell genome, or inhibiting the function of transcriptional control elements. The fact that the genes have not been inactivated in the target cell genome can indicate an involvement in cellular metabolism, catabolism, homeostasis, or any of a wide variety of developmental and cell differentiation processes or the regulation of physiological or endocrine functions in the body, etc. (although treating the target cell with, for example, histone deacetylators can partially compensate for such inactivation and expand the target size of a given trapping construct). These data are especially useful when correlated with cDNA data from differentiated tissues and/or cells or cell lines in order to determine whether the absence of expression is regulated at the level of transcription or gene inactivation.

5.1 POLYNUCLEOTIDES OF THE PRESENT INVENTION

The nucleotide sequences of the various isolated human GTSs of the present invention appear in the Sequence Listing as SEQ ID NOS:9-1008. Additional embodiments of the present invention are GTS variants, or homologs, paralogs, orthologs, etc., which include isolated polynucleotides, or complements thereof, that hybridize to one or more of the

disclosed GTSs of SEQ ID NOS:9-1008 under stringent, or preferably highly stringent, conditions. By way of example and not limitation, high stringency hybridization conditions can be defined as follows: Prehybridization of filters containing DNA to be screened is carried out for 8 h to overnight at 65°C in a buffer containing 6X SSC, 50mM Tris-HCl (pH 7.5), 1mM EDTA, 0.02% PVP, 0.02% Ficoll, 0.02% BSA, and 500 μg/ml denatured salmon sperm DNA. Filters are hybridized for 48 h at 65°C in prehybridization mixture containing 100μg/ml denatured salmon sperm DNA and 5-20 x 10^6 cpm of ^{32}P-labeled probe (alternatively, as in all hybridizations described herein, approximately 42, 44, 46, 48, 50, 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used). The filters are then washed in approximately 1X wash mix (10X wash mix contains 3M NaCl, 0.6M Tris base, and 0.02M EDTA, alternatively, as with all washes described herein, 2X, 3X, 4X, 5X, 6X wash mix, or more, can be used) twice for 5 minutes each at room temperature, then in 1X wash mix containing 1% SDS at 60°C (alternatively, as in all washes described herein, approximately 42, 44, 46, 48, 50, 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used) for about 30 min, and finally in 0.3X wash mix (alternatively, as in all final washes described herein, approximately, 0.2X, 0.4X, 0.6X, 0.8X, 1X, or any concentration between about 2X and about 6X can be used in conjunction with a suitable wash temperature) containing 0.1% SDS at 60°C (alternatively, approximately 42, 44, 46, 48, 50, 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used) for about 30 min. The filters are then air dried and exposed to x-ray film for autoradiography. In an alternative protocol, washing of filters is done for 37°C for 1 h in a solution containing 2X SSC,
0.01% PVP, 0.01% Ficoll, and 0.01% BSA. This is followed by a wash in 0.1X SSC at 50°C for 45 min before autoradiography. Another example of hybridization under highly stringent conditions is hybridization to filter-bound DNA in 0.5 M $NaHPO_4$, 7% sodium dodecyl sulfate (SDS), 1 mM EDTA at 65°C, and washing in 0.1xSSC/0.1% SDS at 68°C (Ausubel F.M. *et al.*, eds., 1989, Current Protocols in Molecular Biology, Vol. I, Green Publishing Associates, Inc., and John Wiley & sons, Inc., New York, at p. 2.10.3).

Preferably, such GTS variants will encode at least a portion or domain of a, preferably naturally occurring, protein or polypeptide that encodes a functional equivalent to a protein or

polypeptide, or portion or domain thereof, encoded by the disclosed GTSs. Additional examples of GTS variants include polynucleotides, or complements thereof, that are capable of binding to the disclosed GTSs under less stringent conditions, such as moderately stringent conditions, (*e.g.*, washing in 0.2xSSC/0.1% SDS at 42° C (Ausubel *et al.*, 1989, *supra*). Moderately stringent conditions can be additionally defined, for example, as follows: Filters containing DNA are pretreated for 6 h at 55°C in a solution containing 6X SSC, 5X Denhart's solution, 0.5% SDS and 100 μg/ml denatured salmon sperm DNA. Hybridizations are carried out in the same solution and 5-20 x 10^6 cpm ^{32}P-labeled probe is used. Filters are incubated in hybridization mixture for 18-20 h at 55°C (alternatively, as in all hybridizations described herein, approximately 42, 44, 46, 48, 50, 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used in combination with a suitable concentration of salt). The filters are then washed in approximately 1X wash mix (10X wash mix contains 3M NaCl, 0.6M Tris base, and 0.02M EDTA, alternatively, as with all washes described herein, 2X, 3X, 4X, 5X, 6X wash mix, or more, can be used) twice for 5 minutes each at room temperature, then in 1X wash mix containing 1% SDS at 60°C (alternatively, as in all washes described herein, approximately, 42, 44, 46, 48, 50, 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used) for about 30 min, and finally in 0.3X wash mix (alternatively, as in all final washes described herein approximately 0.2X, 0.4X, 0.6X, 0.8X, 1X, or any concentration between about 2X and about 6X can be used in conjunction with a suitable wash temperature) containing 0.1% SDS at 60°C (alternatively, approximately 42, 44, 45, 48, 50, 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used) for about 30 min. The filters are then air dried and exposed to x-ray film for autoradiography.

In an alternative protocol, washing of filters is done twice for 30 minutes at 60°C in a solution containing 1X SSC and 0.1% SDS. Filters are blotted dry and exposed for autoradiography.

Other conditions of moderate stringency which may be used are well-known in the art. For example, washing of filters can be done at 37°C for 1 h in a solution containing 2X SSC, 0.1% SDS. Another example of hybridization under moderately stringent conditions is washing in 0.2xSSC/0.1% SDS at 42°C (Ausubel et al., 1989, *supra).* Such less stringent conditions may also be, for example, low stringency hybridization conditions. By way of

example and not limitation, procedures using such conditions of low stringency are as follows (see also Shilo and Weinberg, 1981, Proc. Natl. Acad. Sci. USA 78:6789-6792): Filters containing DNA are pretreated for 6 h at 40°C in a solution containing 35% formamide, 5X SSC, 50mM Tris-HCl (pH 7.5), 5mM EDTA, 0.1% PVP, 0.1% Ficoll, 1% BSA, and 500 μg/ml denatured salmon sperm DNA. Hybridizations are carried out in the same solution with the following modifications: 0.02% PVP, 0.02% Ficoll, 0.2% BSA, 100μg/ml salmon sperm DNA, 10% (wt/vol) dextran sulfate, and 5-20 X 10^6 cpm ^{32}P-labeled probe is used. Filters are incubated in hybridization mixture for 18-20 h at 40°C (alternatively, as in all hybridizations described herein, approximately 42, 44, 46, 48, 50, 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used). The filters are then washed in approximately 1X wash mix (10x wash mix contains 3M NaCl, 0.6M Tris base, and 0.02M EDTA, alternatively, as with all washes described herein, 2X, 3X, 4X, 5X, 6X wash mix, or more, can be used) twice for five minutes each at room temperature, then in 1X wash mix containing 1% SDS at 60°C (alternatively, as in all washes described herein, approximately 42, 44, 46, 48, 50, 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used) for about 30 min, and finally in 0.3X wash mix (alternatively, as in all final washes described herein, approximately, 0.2X, 0.4X, 0.6X, 0.8X, 1X, or any concentration between about 2X and about 6X can be used in conjunction with a suitable wash temperature) containing 0.1% SDS at 60°C (alternatively, approximately 42, 44, 46, 48, 50, 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used) for about 30 min. The filters are then air dried and exposed to x-ray film for autoradiography. In yet another alternative protocol, washing of filters is done for 1.5 h at 55°C in a solution containing 2X SSC, 25mM Tris-HCl (pH 7.4), 5mM EDTA, and 0.1% SDS. The wash solution is replaced with fresh solution and incubated an additional 1.5 h at 60°C. Filters are then blotted dry and exposed for autoradiography. If necessary, filters are washed for a third time at 65-68°C and reexposed to film. Other conditions of low stringency which may be used are well known in the art (*e.g.*, as employed for cross-species hybridizations). Preferably, GTS variants identified or isolated using the above methods will also encode a functionally equivalent gene product (*i.e.*, protein, polypeptide, or domain thereof, encoding or otherwise associated with a function or structure at least partially encoded by the complementary GTS).

Additional embodiments contemplated by the present invention include any polynucleotide sequence comprising a continuous stretch of nucleotide sequence originally disclosed in, or otherwise unique to, any of the GTSs of SEQ ID NOS:9-1008 that are at least 8, or at least 10, or at least 14, or at least 20, or at least 30, or at least about 40, and preferably at least about 60 consecutive nucleotides up to about several hundred bases of nucleotide sequence or an entire GTS sequence. Functional equivalents of the gene products of SEQ ID NOS:9-1008 include naturally occurring variants of SEQ ID NOS:9-1008 present in other species, and mutant variants, both naturally occurring and engineered, which retain at least some of the functional activities of the gene products of SEQ ID NOS:9-1008.

The invention also includes degenerate variants of the claimed GTS sequences, and products encoded thereby. Such variants may be 80% identical to any one of SEQ ID NOS: 9-1008, more preferably 85%, more preferably 90%, more preferably 95% and most preferably 98% identical. The degree of identity (or the degree of homology) of a polynucleotide sequence to any one of SEQ ID NOS: 9-1008 may be determined using any sequence analysis program known in the art, for example, the University of Wisconsin GCG sequence analysis package, SEQUENCHER 3.0, Gene Codes Corp., Ann Arbor, MI. The invention further includes GTS derivatives wherein any of the disclosed GTSs, or GTS variants, is linked to another polynucleotide molecule, or a fragment thereof, wherein the link may be either directly or through other polynucleotides of any sequence and of a length of about 1,000 base pairs, or about 500 base pairs, or about 300 base pairs, or about 200 base pairs, or about 150 base pairs, or about 100 base pairs or about 50 base pairs, or less.

The invention also particularly includes polynucleotide molecules, including DNA, that hybridize to, and are therefore the complements of, the nucleotide sequences of the disclosed GTSs. Such hybridization conditions may be highly stringent or less highly stringent, as described above. In instances wherein the nucleic acid molecules are deoxyoligonucleotides ("DNA oligos"), highly stringent conditions may refer to, for example, washing in 6xSSC/0.05% sodium pyrophosphate at 37° C (for oligos having 14-base DNA oligos), 48° C (for 17-base DNA oligos), 55° C (for 20-base DNA oligos), and 60°C (for 23-base oligos). Similar conditions are contemplated for RNA oligos corresponding to a portion of the disclosed GTS sequences.

These nucleic acid molecules may encode or act as antisense molecules to polynucleotides comprising at least a portion of the sequences shown in SEQ ID NOS:9-1008 that are useful, for example, to regulate the expression of genes comprising a nucleotide sequence of any of SEQ ID NOS:9-1008, and can also be used, for example, as antisense primers in amplification reactions of gene sequences. With respect to gene regulation, such techniques can be used to regulate, for example, developmental processes by modulating the expression of genes in embryonic stem cells. Further, such sequences may be used as part of ribozyme and/or triple helix sequences that can be used to regulate gene expression. Still further, such molecules may be used as components of diagnostic methods whereby, for example, the presence of a particular allele, of a gene that contains any of the sequences of SEQ ID NOS:9-1008 may be detected. Of particular interest is the use of the disclosed GTSs to conduct analysis of single nucleotide polymorphisms (SNPs), and particularly coding region SNPs or "cSNPs", in the human genome, or as general or individual-specific forensic markers. When so applied, a collection of GTSs is obtained from an individual, and screened against a control database of cSNPs (or other genetic markers) that have previously been associated with disease, suitability or susceptibility (or sensitivity) to specific drugs or therapies, or virtually any other human trait that correlates with a given cSNP or genetic marker, or assortment thereof. In addition to disease/diagnostic testing, the described GTSs are also useful as genetic markers for the prenatal analysis of congenital traits or defects.

In addition to the nucleotide sequences described above, full length cDNA or gene sequences that contain any of SEQ ID NOS:9-1008 present in the same species and/or homologs of any of those genes present in other species can be identified and isolated by using molecular biological techniques known in the art.

In order to clone the full length cDNA sequence from any species encoding the cDNA corresponding to the entire messenger RNA or to clone variant or heterologous forms of the molecule, labeled DNA probes made from nucleic acid fragments corresponding to any of the partial cDNA disclosed herein may be used to screen a cDNA library. For example, oligonucleotides corresponding to either the 5' or 3' terminus of the cDNA sequence may be used to obtain longer nucleotide sequences. Briefly, the library may be plated out to yield a maximum of about 30,000 pfu for each 150 mm plate. Approximately 40 plates may be

screened. The plates are incubated at 37° C until the plaques reach a diameter of 0.25 mm or are just beginning to make contact with one another (3-8 hours). Nylon filters are placed onto the soft top agarose and after 60 seconds, the filters are peeled off and floated on a DNA denaturing solution consisting of 0.4N sodium hydroxide. The filters are then immersed in neutralizing solution consisting of 1 M Tris HCl, pH 7.5, before being allowed to air dry. The filters are prehybridized in casein hybridization buffer containing 10% dextran sulfate, 0.5 M NaCl, 50 mM Tris HCL, pH 7.5, 0.1% sodium pyrophosphate, 1% casein, 1% SDS, and denatured salmon sperm DNA at 0.5 mg/ml for 6 hours at 60° C. The radiolabelled probe is then denatured by heating to 95° C for 2 minutes and then added to the prehybridization solution containing the filters. The filters are hybridized at 60° C (alternatively, as in all hybridizations described herein, approximately 42, 44, 46, 48, 50. 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used) for about 16 hours. The filters are then washed in approximately 1X wash mix (10X wash mix contains 3M NaCl, 0.6M Tris base, and 0.02M EDTA, alternatively, as with all washes described herein, 2X, 3X, 4X, 5X, 6X wash mix, or more, can be used) twice for 5 minutes each at room temperature, then in 1X wash mix containing 1% SDS at 60° C (alternatively, as in all washes described herein, approximately 42, 44, 46, 48, 50. 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used) for about 30 min, and finally in 0.3X wash mix (alternatively, as in all final washes described herein, approximately, 0.2X, 0.4X, 0.6X, 0.8X, 1X, or any concentration between about 2X and about 6X can be used in conjunction with a suitable wash temperature) containing 0.1% SDS at 60° C (alternatively, approximately 42, 44, 46, 48, 50. 52, 54, 56, 58, 62, 64, 66, 68, 70, or about 72 degrees or more can be used) for about 30 min. The filters are then air dried and exposed to x-ray film for autoradiography. After developing, the film is aligned with the filters to select a positive plaque. If a single, isolated positive plaque cannot be obtained, the agar plug containing the plaques will be removed and placed in lambda dilution buffer containing 0.1M NaCl, 0.01M magnesium sulfate, 0.035M Tris HCl, pH 7.5, 0.01% gelatin. The phage may then be replated and rescreened to obtain single, well isolated positive plaques. Positive plaques may be isolated and the cDNA clones sequenced using primers based on the known cDNA sequence. This step may be repeated until a full length cDNA is obtained.

It may be necessary to screen multiple cDNA libraries from different sources/tissues to obtain a full length cDNA. In the event that it is difficult to identify cDNA clones encoding the complete 5' terminal coding region, an often encountered situation in cDNA cloning, the RACE (Rapid Amplification of cDNA Ends) technique may be used. RACE is a proven PCR-based strategy for amplifying the 5' end of incomplete cDNAs. 5'-RACE-Ready cDNA synthesized from human fetal liver containing a unique anchor sequence is commercially available (Clontech). To obtain the 5' end of the cDNA, PCR is carried out, for example, on 5'-RACE-Ready cDNA using the provided anchor primer and the 3' primer. A secondary PCR reaction is then carried out using the anchored primer and a nested 3' primer according to the manufacturer's instructions.

Once obtained, the full length cDNA sequence may be translated into amino acid sequence and examined for certain landmarks found in the amino acid sequences encoded by SEQ ID NOS:9-1008, or any structural similarities to these disclosed sequences.

The identification of homologs, heterologs, or paralogs of SEQ ID NOS:9-1008 in other, preferably related, species can be useful for developing additional animal model systems that are closely related to humans for purposes of drug discovery. Genes at other genetic loci within the genome that encode proteins which have extensive homology to one or more domains of the gene products encoded by SEQ ID NOS:9-1008 can also be identified via similar techniques. In the case of cDNA libraries, such screening techniques can identify clones derived from alternatively spliced transcripts in the same or different species.

Screening can be done using filter hybridization with duplicate filters. The labeled probe can contain at least 15-30 base pairs of the nucleotide sequence presented in SEQ ID NOS:9-1008. The hybridization washing conditions used should be of a lower stringency when the cDNA library is derived from an organism different from, or heterologous to, the type of organism from which the labeled sequence was derived. With respect to the cloning of a mammalian homolog, heterolog, ortholog, or paralog, using probes derived from any of the sequences of SEQ ID NOS:9-1008, for example, hybridization can, for example, be performed at 65° C overnight in Church's buffer (7% SDS, 250 mM $NaHPO_4$, 2 mM EDTA, 1% BSA). Washes can be done with 2XSSC, 0.1% SDS at 65° C and then at 0.1XSSC, 0.1% SDS at 65° C.

Low stringency conditions are well known to those of skill in the art, and will vary predictably depending on the specific organisms from which the library and the labeled sequences are derived. For guidance regarding such conditions see, for example, Sambrook *et al.*, 1989, Molecular Cloning, A Laboratory Manual, Cold Springs Harbor Press, N.Y.; and Ausubel *et al.*, 1989, Current Protocols in Molecular Biology, Green Publishing Associates and Wiley Interscience, N.Y.

Alternatively, the labeled nucleotide probe of a sequence of any of SEQ ID NOS:9-1008 may be used to screen a genomic library derived from the organism of interest, again, using appropriately stringent conditions. The identification and characterization of human genomic clones is helpful for designing diagnostic tests and clinical protocols for treating disorders in human patients that are known or suspected to be linked to disease or other developmental or cell differentiation disorders and abnormalities. For example, sequences derived from regions adjacent to the intron/exon boundaries of the human gene can be used to design primers for use in amplification assays to detect mutations within the exons, introns, splice sites (*e.g.*, splice acceptor and/or donor sites), etc., that can be used in diagnostics.

Further, gene homologs can also be isolated from nucleic acid of the organism of interest by performing PCR using two oligonucleotide primers derived from SEQ ID NOS:9-1008 or two degenerate oligonucleotide primer pools designed on the basis of amino acid sequences within the gene products encoded by SEQ ID NOS:9-1008. The template for the reaction may be cDNA obtained by reverse transcription of mRNA prepared from, for example, human or non-human cell lines, cell types, or tissues, like, for example, ES cells from the organism of interest.

The PCR product may be subcloned or sequenced directly or subcloned and sequenced to ensure that the amplified sequences represent the sequences of the gene corresponding to the sequence of SEQ ID NOS:9-1008 of interest. The PCR fragment may then be used to isolate a full length cDNA clone by a variety of methods. For example, the amplified fragment may be labeled and used to screen a cDNA library, such as a bacteriophage cDNA library. Alternatively, the labeled fragment may be used to isolate genomic clones via the screening of a genomic library.

PCR technology may also be utilized to isolate full length cDNA sequences. For example, RNA can be isolated using standard procedures from an appropriate cellular source (*i.e.*, one known, or suspected, to express the gene corresponding to the sequence of SEQ ID NOS:9-1008 of interest, such as, for example, ES cells). A reverse transcription reaction may be performed on the RNA using an oligonucleotide primer specific for the most 5' end of the amplified fragment for the priming of first strand synthesis. The resulting RNA/DNA hybrid may then be "tailed" with guanines, for example, using a standard terminal transferase reaction, the hybrid may be digested with RNase H, and second strand synthesis may then be primed with a poly-C primer. Thus, cDNA sequences upstream from the amplified fragment may easily be isolated. For a review of cloning strategies which may be used, see *e.g.*, Sambrook *et al.*, 1989, supra. Alternatively, cDNA or genomic libraries can be screened using 5' PCR primers that hybridize to vector sequences and 3' PCR primers specific to the gene of interest. Typically, such primers comprise oligonucleotide "priming" sequences first disclosed in, or otherwise unique to, one of the GTSs of SEQ ID NOS:9-1008.

The sequence of a gene corresponding to any of the sequences of SEQ ID NOS:9-1008 can also be used to isolate mutant alleles of that gene. Such mutant alleles may be isolated from individuals either known or suspected to have a genotype which contributes to the disease of interest or other symptoms of developmental and cell differentiation and/or proliferation disorders and abnormalities. Mutant alleles and mutant allele products may then be utilized in the therapeutic and diagnostic programs described below. Additionally, such sequences of any of the genes corresponding to SEQ ID NOS:9-1008 can be used to detect gene regulatory (*e.g.*, promoter or promoter/enchancer) defects which can affect development or cell differentiation.

A cDNA of a mutant gene corresponding to any of the sequences of SEQ ID NOS:9-1008 can be isolated as discussed above, or, for example, by using PCR. In this case, the first cDNA strand may be synthesized by hybridizing an oligo-dT oligonucleotide to mRNA isolated from cells derived from an individual suspected of carrying a mutant gene corresponding to any of the sequences of SEQ ID NOS:9-1008 by extending the new strand with reverse transcriptase. The second strand of the cDNA is then synthesized using an oligonucleotide that hybridizes specifically to the 5' region of the normal gene. The amplified

product can be directly sequenced or cloned into a suitable vector and subsequently subjected to DNA sequence analysis. By comparing the DNA sequence of the mutant allele to that of the normal allele, the mutation(s) responsible for the loss or alteration of function of the mutant gene product can be ascertained.

Alternatively, a genomic library can be constructed using DNA obtained from one or more individuals suspected of carrying, or known to carry, a mutant allele corresponding to any of SEQ ID NOS:9-1008. Corresponding mutant cDNA libraries can be also constructed using RNA from cell types known, or suspected, to express such mutant alleles. The corresponding normal gene, or any suitable fragment thereof, may then be labeled and used as a probe to identify the corresponding mutant allele in such libraries. Clones containing the mutant gene sequences may then be identified and analyzed by DNA sequence analysis. Additionally, a protein expression library can be constructed utilizing cDNA synthesized from, for example, RNA isolated from a cell type known, or suspected, to express a mutant allele corresponding to any of the sequences of SEQ ID NOS:9-1008 from an individual suspected of, carrying or known to carry, such a mutant allele. In this manner, gene products made by the putatively mutant cell type may be expressed and screened using standard antibody screening techniques in conjunction with antibodies raised against the corresponding normal gene product or a portion thereof, as described below in Section 5.4 (For screening techniques, see, for example, Harlow, E. and Lane, eds., 1988, "Antibodies: A Laboratory Manual", Cold Spring Harbor Press, Cold Spring Harbor.) Additionally, screening can be accomplished by screening with labeled fusion proteins. In cases where a mutation results in an expressed gene product with altered function (*e.g.*, as a result of a missense or a frame shift mutation), a polyclonal set of antibodies to the wild-type gene product are likely to cross-react with the mutant gene product. Library clones detected via their reaction with such labeled antibodies can be purified and subjected to sequence analysis according to methods well known to those of skill in the art.

The invention also encompasses nucleotide sequences that encode mutant isoforms of any of the amino acid sequences encoded by the GTSs of SEQ ID NOS:9-1008, peptide fragments thereof, truncated versions thereof, and fusion proteins including any of the above. Examples of such fusion proteins can include, but not limited to, an epitope tag which aids in

purification or detection of the resulting fusion protein; or an enzyme, fluorescent protein, luminescent protein which can be used as a marker.

The present invention additionally encompasses (a) RNA or DNA vectors that contain any portion of SEQ ID NOS:9-1008 and/or their complements as well as any of the peptides or proteins encoded thereby; (b) DNA vectors that contain a cDNA that substantially spans the entire open reading frame corresponding to any of the sequences of SEQ ID NOS:9-1008 and/or their complements; (c) DNA expression vectors that have or contain any of the foregoing sequences, or a portion thereof, operatively associated with a (d) genetically engineered host cells that contain a cDNA that spans the entire open reading frame, or any portion thereof, corresponding to any of the sequences of SEQ ID NOS:9-1008 operatively associated with a regulatory element, generally recombinantly positioned either *in vivo* (such as in gene activation) or *in vitro* that directs the expression of the coding sequences in the host cell. As used herein, regulatory elements include, but are not limited to,inducible and non-inducible promoters, enhancers, operators and other elements known to those skilled in the art that drive and regulate expression. Such regulatory elements include, but are not limited to,the baculovirus promoter, cytomegalovirus hCMV immediate early gene promoter, the early or late promoters of SV40 adenovirus, the *lac* system, the *trp* system, the *TAC* system, the *TRC* system, the major operator and promoter regions of phage A, the control regions of fd coat protein, acid phosphatase promoters, phosphoglycerate kinase (PGK) and especially 3-phosphoglycerate kinase promoters, and yeast alpha mating factors.

An additional application of the described novel human polynucleotide sequences is their use in the molecular mutagenesis/evolution of proteins that are at least partially encoded by the described novel sequences using, for example, polynucleotide shuffling or related methodologies. Such approaches are described in U.S. Patents Nos. 5,830,721 and 5,837,458 which are herein incorporated by reference in their entirety.

5.2 PROTEINS AND POLYPEPTIDES ENCODED BY POLYNUCLEOTIDES EXPRESSED IN MODIFIED HUMAN CELLS

Peptides and proteins encoded by the open reading frame of mRNAs corresponding to SEQ ID NOS:9-1008, polypeptides and peptide fragments, mutated, truncated or deleted

forms of those peptides and proteins, fusion proteins containing any of those peptides and proteins can be prepared for a variety of uses, including, but not limited to, the generation of antibodies, as reagents in diagnostic assays, the identification of other cellular gene products involved in the regulation of development and cellular differentiation of various cell types, like, for example, ES cells, as reagents in assays for screening for compounds that can be used in the treatment of disorders affecting development and cell differentiation, and as pharmaceutical reagents useful in the treatment of disorders affecting development and cell differentiation.

The invention also encompasses proteins, peptides, and polypeptides that are functionally equivalent to those encoded by SEQ ID NOS:9-1008. Such functionally equivalent products include, but are not limited to, additions or substitutions of amino acid residues within the amino acid sequence encoded by the nucleotide sequences described above, but which result in a silent change, thus producing a functionally equivalent gene product. Amino acid substitutions can be made on the basis of similarity in polarity, charge, solubility, hydrophobicity, hydrophilicity, and/or the amphipathic nature of the residues involved. For example, nonpolar (hydrophobic) amino acids include alanine, leucine, isoleucine, valine, proline, phenylalanine, tryptophan, and methionine; polar neutral amino acids include glycine, serine, threonine, cysteine, tyrosine, asparagine, and glutamine; positively charged (basic) amino acids include arginine, lysine, and histidine; and negatively charged (acidic) amino acids include aspartic acid and glutamic acid.

While random mutations can be introduced into DNA encoding peptides and proteins of the current invention (using random mutagenesis techniques well known to those skilled in the art), and the resulting mutant peptides and proteins tested for activity, site-directed mutations of the coding sequence can be engineered (using standard site-directed mutagenesis techniques) to generate mutant peptides and proteins of the current invention having increased functionality.

For example, the amino acid sequence of peptides and proteins of the current invention can be aligned with homologs from different species. Mutant peptides and proteins can be engineered so that regions of interspecies identity are maintained, whereas the variable residues are altered, *e.g.*, by deletion or insertion of an amino acid residue(s) or by

substitution of one or more different amino acid residues. Conservative alterations at the variable positions can be engineered in order to produce a mutant form of a peptide or protein of the current invention that retains function. Non-conservative changes can be engineered at these variable positions to alter function. Alternatively, where alteration of function is desired, deletion or non-conservative alterations of the conserved regions can be engineered. One of skill in the art may easily test such mutant or deleted form of a peptide or protein of the current invention for these alterations in function using the teachings presented herein.

Other mutations to the coding sequences described above can be made to generate peptides and proteins that are better suited for expression, scale up, etc. in the host cells chosen. For example, the triplet code for each amino acid can be modified to conform more closely to the preferential codon usage of the host cell's translational machinery, or, for example, to yield a messenger RNA molecule with a longer half-life. Those skilled in the art would readily know what modifications of the nucleotide sequence would be desirable to conform the nucleotide sequence to preferential codon usage or to make the messenger RNA more stable. Such information would be obtainable, for example, through use of computer programs, through review of available research data on codon usage and messenger RNA stability, and through other means known to those of skill in the art.

Peptides corresponding to one or more domains (or a portion of a domain) of one of the proteins described above, truncated or deleted proteins, as well as fusion proteins in which the full length protein described above, a subunit peptide or truncated version is fused to an unrelated protein are also within the scope of the invention and can be designed by those of skill in the art on the basis of experimental or functional considerations. Such fusion proteins include, but are not limited to, fusions to an epitope tag; or fusions to an enzyme, fluorescent protein, or luminescent protein which provide a marker function.

While the peptides and proteins of the current invention can be chemically synthesized (*e.g.*, see Creighton, 1983, Proteins: Structures and Molecular Principles, W.H. Freeman & Co., N.Y.), large polypeptides derived from any of the polynucleotides described above may advantageously be produced by recombinant DNA technology using techniques well known in the art for expressing genes and/or coding sequences. These methods include, for example, *in vitro* recombinant DNA techniques, synthetic techniques, and *in vivo* genetic

recombination. See, for example, the techniques described in Sambrook *et al.*, 1989, *supra*, and Ausubel *et al.*, 1989, *supra*. Alternatively, RNA capable of encoding any of the nucleotide sequences described above may be chemically synthesized using, for example, synthesizers. See, for example, the techniques described in "Oligonucleotide Synthesis", 1984, Gait, M.J. ed., IRL Press, Oxford, which is incorporated by reference herein in its entirety.

A variety of host-expression vector systems may be utilized to express the nucleotide sequences of the invention. Where the peptide or protein to be synthesized is a soluble derivative, the peptide or polypeptide can be recovered from the culture, *i.e.*, from the host cell in cases where the peptide or polypeptide is not secreted, and from the culture media in cases where the peptide or polypeptide is secreted by the cells. However, such engineered host cells themselves may be used in situations where it is important not only to retain the structural and functional characteristics of the expressed peptide or protein, but to assess biological activity, *e.g.*, in drug screening assays.

The expression systems that may be used for purposes of the invention include, but are not limited to, microorganisms such as bacteria (*e.g.*, *E. coli*, *B. subtilis*) transformed with recombinant bacteriophage DNA, plasmid DNA or cosmid DNA expression vectors containing a nucleotide sequence of the current invention; yeast (*e.g.*, *Saccharomyces*, *Pichia*) transformed with recombinant yeast expression vectors containing a nucleotide sequence of the current invention; insect cell systems infected with recombinant virus expression vectors (*e.g.*, baculovirus) containing a nucleotide sequence of the current invention; plant cell systems infected with recombinant virus expression vectors (*e.g.*, cauliflower mosaic virus, CaMV; tobacco mosaic virus, TMV) or transformed with recombinant plasmid expression vectors (*e.g.*, Ti plasmid) containing a nucleotide sequence of the current invention; or mammalian cell systems (*e.g.*, COS, CHO, BHK, 293, 3T3, U937) harboring recombinant expression constructs containing promoters derived from the genome of mammalian cells (*e.g.*, metallothionein promoter) or from mammalian viruses (*e.g.*, the adenovirus late promoter; the vaccinia virus 7.5K promoter).

In bacterial systems, a number of expression vectors may be advantageously selected depending upon the use intended for the gene product being expressed. For example, when

large quantities of such a protein are to be produced for the generation of pharmaceutical compositions of a protein or for raising antibodies to the protein to be expressed, for example, vectors which direct the expression of high levels of fusion protein products that are readily purified may be desirable. Such vectors include, but are not limited to, the *E. coli* expression vector pUR278 (Ruther *et al.*, 1983, EMBO J. *2*:1791), in which the coding sequence of the polynucleotide to be expressed may be ligated individually into the vector in frame with the *lacZ* coding region so that a fusion protein is produced; pIN vectors (Inouye & Inouye, 1985, Nucleic Acids Res. *13*:3101-3109; Van Heeke & Schuster, 1989, J. Biol. Chem. *264*:5503-5509); and the like. pGEX vectors may also be used to express foreign polypeptides as fusion proteins with glutathione S-transferase (GST). If the inserted sequence encodes a relatively small polypeptide (less than 25 kD), such fusion proteins are generally soluble and can easily be purified from lysed cells by adsorption to glutathione-agarose beads followed by elution in the presence of free glutathione. The pGEX vectors are designed to include thrombin or factor Xa protease cleavage sites so that the cloned target gene product can be released from the GST moiety. Alternatively, if the resulting fusion protein is insoluble and forms inclusion bodies in the host cell, the inclusion bodies may be purified and the recombinant protein solubilized using techniques well known to one of skill in the art.

In an insect system, *Autographa californica* nuclear polyhidrosis virus (AcNPV) may be used as a vector to express foreign genes. (*e.g.*, see Smith *et al.*, 1983, J. Virol. *46*: 584; Smith, U.S. Patent No. 4,215,051). In one embodiment of the current invention, Sf9 insect cells are infected with a baculovirus vector expressing a peptide or protein of the current invention.

In mammalian host cells, a number of viral-based expression systems may be utilized. Specific embodiments (described more fully below) include the gene trap cDNA sequences of the current invention that are expressed by a CMV promoter to transiently express recombinant protein in U937 cells or in Cos-7 cells. Alternatively, retroviral vector systems well known in the art may be used to insert the recombinant expression construct into host cells, or vaccinia virus-based expression systems may be employed.

In yeast, a number of vectors containing constitutive or inducible promoters may be used. For a review, see Current Protocols in Molecular Biology, Vol. 2, 1988, Ed. Ausubel *et*

al., Greene Publish. Assoc. & Wiley Interscience, Ch. 13; Grant *et al.*, 1987, Expression and Secretion Vectors for Yeast, in Methods in Enzymology, Eds. Wu & Grossman, 1987, Acad. Press, N.Y., Vol. 153, pp. 516-544; Glover, 1986, DNA Cloning, Vol. II, IRL Press, Wash., D.C., Ch. 3; and Bitter, 1987, Heterologous Gene Expression in Yeast, Methods in Enzymology, Eds. Berger & Kimmel, Acad. Press, N.Y., Vol. 152, pp. 673-684; and The Molecular Biology of the Yeast Saccharomyces, 1982, Eds. Strathern *et al.*, Cold Spring Harbor Press, Vols. I and II.

In cases where plant expression vectors are used, the expression of the coding sequence may be driven by any of a number of promoters. For example, viral promoters such as the 35S RNA and 19S RNA promoters of CaMV (Brisson *et al.*, 1984, Nature, *310*:511-514), or the coat protein promoter of TMV (Takamatsu *et al.*, 1987, EMBO J. *6*:307-311) may be used; alternatively, plant promoters such as the small subunit of RUBISCO (Coruzzi *et al.*, 1984, EMBO J. *3*:1671-1680; Broglie *et al.*, 1984, Science *224*:838-843); or heat shock promoters, *e.g.*, soybean hsp17.5-E or hsp17.3-B (Gurley *et al.*, 1986, Mol. Cell. Biol. 6:559-565) may be used. These constructs can be introduced into plant cells using Ti plasmids, Ri plasmids, plant virus vectors, direct DNA transformation, microinjection, electroporation, etc. For reviews of such techniques see, for example, Weissbach & Weissbach, 1988, Methods for Plant Molecular Biology, Academic Press, NY, Section VIII, pp. 421-463; and Grierson & Corey, 1988, Plant Molecular Biology, 2d Ed., Blackie, London, Ch. 7-9.

In cases where an adenovirus is used as an expression vector, the nucleotide sequence of interest may be ligated to an adenovirus transcription/translation control complex, *e.g.*, the late promoter and tripartite leader sequence. This chimeric gene may then be inserted in the adenovirus genome by *in vitro* or *in vivo* recombination. Insertion in a non-essential region of the viral genome (*e.g.*, region E1 or E3) will result in a recombinant virus that is viable and capable of expressing the gene product of interest in infected hosts. (*e.g.*, See Logan & Shenk, 1984, Proc. Natl. Acad. Sci. USA *81*:3655-3659). Specific initiation signals may also be required for efficient translation of inserted nucleotide sequences of interest. These signals include the ATG initiation codon and adjacent sequences. In cases where an entire gene or cDNA, including its own initiation codon and adjacent sequences, is inserted into the appropriate expression vector, no additional translational control signals may be needed.

However, in cases where only a portion of a coding sequence of interest is inserted, exogenous translational control signals, including, perhaps, the ATG initiation codon, must be provided. Furthermore, the initiation codon must be in phase with the reading frame of the desired coding sequence to ensure translation of the entire insert. These exogenous translational control signals and initiation codons can be of a variety of origins, both natural and synthetic. The efficiency of expression may be enhanced by the inclusion of appropriate transcription enchanter elements, transcription terminators, etc. (See Bittner *et al.*, 1987, Methods in Enzymol. *153*:516-544).

In addition, a host cell strain may be chosen which modulates the expression of the inserted sequences, or modifies and processes the gene product in the specific fashion desired. Such modifications (*e.g.*, glycosylation) and processing (*e.g.*, cleavage) of protein products may be important for the function of the protein. Different host cells have characteristic and specific mechanisms for the post-translational processing and modification of proteins and gene products. Appropriate cell lines or host systems can be chosen to ensure the correct modification and processing of the foreign protein expressed. To this end, eukaryotic host cells which possess the cellular machinery for proper processing of the primary transcript may be used. Such mammalian host cells include, but are not limited to,CHO, VERO, BHK, HeLa, COS, MDCK, 293, 3T3, WI38, and U937 cells.

For long-term, high-yield production of recombinant proteins, stable expression is preferred. For example, cell lines which stably express the sequences of interest described above may be engineered. Rather than using expression vectors which contain viral origins of replication, host cells can be transformed with DNA controlled by appropriate expression control elements (*e.g.*, promoter, enchanter sequences, transcription terminators, polyadenylation sites, etc.), and a selectable marker. Following the introduction of the foreign DNA, engineered cells may be allowed to grow for 1-2 days in an enriched media, and then are switched to a selective media. The selectable marker in the recombinant plasmid confers resistance to the selection and allows cells to stably integrate the plasmid into their chromosomes and grow to form foci which in turn can be cloned and expanded into cell lines. This method may advantageously be used to engineer cell lines which express the gene

product of interest. Such engineered cell lines may be particularly useful in screening and evaluation of compounds that affect the endogenous activity of the gene product of interest.

A number of selection systems may be used, including but not limited to the herpes simplex virus thymidine kinase (Wigler *et al.*, 1977, Cell *11*:223), hypoxanthine-guanine phosphoribosyltransferase (Szybalska & Szybalski, 1962, Proc. Natl. Acad. Sci. USA *48*:2026), and adenine phosphoribosyltransferase (Lowy *et al.*, 1980, Cell *22*:817) genes can be employed in tk^-, $hgprt^-$ or $aprt^-$ cells, respectively. Also, antimetabolite resistance can be used as the basis of selection for the following genes: dhfr, which confers resistance to methotrexate (Wigler *et al.*, 1980, Natl. Acad. Sci. USA *77*:3567; O'Hare *et al.*, 1981, Proc. Natl. Acad. Sci. USA *78*:1527); gpt, which confers resistance to mycophenolic acid (Mulligan & Berg, 1981, Proc. Natl. Acad. Sci. USA *78*:2072); neo, which confers resistance to the aminoglycoside G-418 (Colberre-Garapin *et al.*, 1981, J. Mol. Biol. *150*:1); and hygro, which confers resistance to hygromycin (Santerre *et al.*, 1984, Gene *30*:147).

The gene products of interest can also be expressed in transgenic animals. Animals of any species, including, but not limited to, mice, rats, rabbits, guinea pigs, pigs, micro-pigs, goats, and non-human primates, *e.g.*, baboons, monkeys, and chimpanzees may be used to generate transgenic animals carrying the polynucleotide of interest of the current invention.

Any technique known in the art may be used to introduce the transgene of interest into animals to produce the founder lines of transgenic animals. Such techniques include, but are not limited to pronuclear microinjection (Hoppe, P.C. and Wagner, T.E., 1989, U.S. Pat. No. 4,873,191); retrovirus mediated gene transfer into germ lines (Van der Putten *et al.*, 1985, Proc. Natl. Acad. Sci., USA *82*:6148-6152); gene targeting in embryonic stem cells (Thompson *et al.*, 1989, Cell *56*:313-321); electroporation of embryos (Lo, 1983, Mol Cell. Biol. *3*:1803-1814); sperm-mediated gene transfer (Lavitrano *et al.*, 1989, Cell *57*:717-723); positive-negative selection as described in U.S. Patent No. 5,464,764 herein incorporated by reference. For a review of such techniques, see Gordon, 1989, Transgenic Animals, Intl. Rev. Cytol. *115*:171-229, which is incorporated by reference herein in its entirety.

The present invention provides for transgenic animals that carry the transgene of interest in all their cells, as well as animals which carry the transgene in some, but not all their cells, *i.e.*, mosaic animals. The transgene may be integrated as a single transgene or in

concatamers, *e.g.*, head-to-head tandems or head-to-tail tandems. The transgene may also be selectively introduced into and activated in a particular cell type by following, for example, the teaching of Lasko *et al.* (Lasko, M. *et al.*, 1992, Proc. Natl. Acad. Sci. USA *89*:6232-6236). The regulatory sequences required for such a cell-type specific activation will depend upon the particular cell type of interest, and will be apparent to those of skill in the art. When it is desired that the transgene of interest be integrated into the chromosomal site of the endogenous copy of that same gene, gene targeting is preferred. Briefly, when such a technique is to be utilized, vectors containing some nucleotide sequences homologous to the endogenous gene of interest are designed for the purpose of integrating, via homologous recombination with chromosomal sequences, into and disrupting the function of the nucleotide sequence of the endogenous gene of interest. In this way, the expression of the endogenous gene may also be eliminated by inserting non-functional sequences into the endogenous gene. The transgene may also be selectively introduced into a particular cell type, thus inactivating the endogenous gene of interest in only that cell type, by following, for example, the teaching of Gu *et al.* (Gu *et al.*, 1994, Science *265*: 103-106). The regulatory sequences required for such a cell-type specific inactivation will depend upon the particular cell type of interest and will be apparent to those of skill in the art.

Once transgenic animals have been generated, the expression of the recombinant gene of interest may be assayed utilizing standard techniques. Initial screening may be accomplished by Southern blot analysis or PCR techniques to analyze animal tissues to assay whether integration of the transgene has taken place. The level of mRNA expression of the transgene in the tissues of the transgenic animals may also be assessed using techniques which include, but are not limited to, Northern blot analysis of cell type samples obtained from the animal, *in situ* hybridization analysis, and RT-PCR. Samples of gene-expressing tissue, may also be evaluated immunocytochemically using antibodies specific for the transgene product, as described below.

5.3 CELLS THAT CONTAIN A DISRUPTED ALLELE OF A GENE ENCODING A POLYNUCLEOTIDE OF THE CURRENT INVENTION

Another aspect of the current invention are cells which contain a gene that encodes a polynucleotide of the current invention and that has been disrupted. Those of skill in the art would know how to disrupt a gene in a cell using techniques known in the art. Also, techniques useful to disrupt a gene in a cell and especially an ES cell, that may already be disrupted, as disclosed in copending US patent applications Nos. 08/726,867; 08/728,963; 08/907,598; and 08/942,806, all of which are hereby incorporated herein by reference in their entirety, are within the scope of the current invention to disrupt a gene that encodes a polynucleotide of the current invention.

5.3.1 IDENTIFICATION OF CELLS THAT EXPRESS GENES ENCODING POLYNUCLEOTIDES OF THE CURRENT INVENTION

Host cells that contain coding sequence and/or express a biologically active gene product, or fragment thereof, encoded by a gene corresponding to a GTS present invention may be identified by at least four general approaches; (a) DNA-DNA or DNA-RNA hybridization; (b) the presence or absence of "marker" gene functions; (c) assessing the level of transcription as measured by the expression of mRNA transcripts in the host cell; and (d) detection of the gene product as measured by immunoassay, enzymatic assay, chemical assay, or by its biological activity. Prior to screening for gene expression, the host cells can first be treated in an effort to increase the level of expression of genes encoding polynucleotides of the current invention, especially in cell lines that produce low amounts of the mRNAs and/or peptides and proteins of the current invention.

In the first approach, the presence of the coding sequence for peptides and proteins of the current invention inserted in the expression vector can be detected by DNA-DNA or DNA-RNA hybridization using probes comprising nucleotide sequences that are homologous to the coding sequence for peptides and proteins of the current invention, respectively, or portions or derivatives thereof.

In the second approach, the recombinant expression vector/host system can be identified and selected based upon the presence or absence of certain "marker" gene functions

(*e.g.*, thymidine kinase activity, resistance to antibiotics, resistance to methotrexate, transformation phenotype, occlusion body formation in baculovirus, etc.). For example, if the coding sequence for the peptide or protein of the current invention is inserted within a marker gene sequence of the vector, recombinants containing the coding sequence for the peptide or protein of the current invention can be identified by the absence of the marker gene function. Alternatively, a marker gene can be placed in tandem with the sequence for the peptide or protein of the current invention under the control of the same or different promoter used to control the expression of the coding sequence for the peptide or protein of the current invention. Expression of the marker in response to induction or selection indicates expression of the coding sequence for the peptide or protein of the current invention.

In the third approach, transcriptional activity for the coding region of genes specific for peptides and proteins of the current invention can be assessed by hybridization assays. For example, RNA can be isolated and analyzed by Northern blot using a probe derived from a GTS, or any portion thereof. Alternatively, total nucleic acids of the host cell may be extracted and assayed for hybridization to such probes. Additionally, RT-PCR (using GTS specific oligos/products) may be used to detect low levels of gene expression in a sample, or in RNA isolated from a spectrum of different tissues, or PCR can be used can be used to screen a variety of cDNA libraries derived from different tissues to determine which tissues express a given GTS.

In the fourth approach, the expression of the peptides and proteins of the current invention can be assessed immunologically, for example by Western blots, immunoassays such as radioimmuno-precipitation, enzyme-linked immunoassays and the like. This can be achieved by using an antibody and a binding partner specific to a peptide or protein of the current invention.

5.4 ANTIBODIES TO PROTEINS OF THE CURRENT INVENTION

Antibodies that specifically recognize one or more epitopes of a peptide or protein of the current invention, or epitopes of conserved variants of a peptide or protein at least partially encoded by a GTS of the present invention, or any and all peptide fragments thereof, are also encompassed by the invention. Such antibodies include, but are not limited

to,polyclonal antibodies, monoclonal antibodies (mAbs), humanized or chimeric antibodies, single chain antibodies, Fab fragments, $F(ab')_2$ fragments, fragments produced by a Fab expression library, anti-idiotypic (anti-Id) antibodies, and epitope-binding fragments of any of the above.

The antibodies of the invention may be used, for example, in the detection of the peptide or protein of interest of the current invention in a biological sample and may, therefore, be utilized as part of a diagnostic or prognostic technique whereby patients may be tested for abnormal amounts of these proteins. Such antibodies may also be utilized in conjunction with, for example, compound screening schemes as described, below in Section 5.6 for the evaluation of the effect of test compounds on expression and/or activity of the gene products of interest of the current invention. Additionally, such antibodies can be used in conjunction with the gene therapy and gene delivery techniques described below to, for example, evaluate the normal and/or engineered peptide- or protein-expressing cells prior to their introduction into the patient. Such antibodies may additionally be used as a method for inhibiting the abnormal activity of a peptide or protein of interest at least partially encoded by a GTS of the present invention. Thus, such antibodies may, for example, be utilized as part of treatment methods for development and cell differentiation disorders.

For the production of antibodies, various host animals may be immunized by injection with the peptide or protein of interest, a subunit peptide of such protein, a truncated polypeptide, functional equivalents of the peptide or protein, mutants of the peptide or protein, or denatured forms of the above. Such host animals may include, but are not limited to,rabbits, mice, and rats, to name but a few. Various adjuvants can be used to increase the immunological response, depending on the host species, including but not limited to Freund's (complete and incomplete), mineral gels such as aluminum hydroxide, surface active substances such as lysolecithin, pluronic polyols, polyanions, peptides, oil emulsions, keyhole limpet hemocyanin, dinitrophenol, and potentially useful human adjutants such as BCG (bacille Calmette-Guerin) and *Corynebacterium parvum*. Polyclonal antibodies are heterogeneous populations of antibody molecules derived from the sera of the immunized animals.

Monoclonal antibodies, which are homogeneous populations of antibodies to a particular antigen, may be obtained by any technique which provides for the production of antibody molecules by continuous cell lines in culture. These include, but are not limited to, the hybridoma technique of Kohler and Milstein, (1975, Nature *256*:495-497; and U.S. Patent No. 4,376,110), the human B-cell hybridoma technique (Kosbor *et al.*, 1983, Immunology Today *4*:72; Cole *et al.*, 1983, Proc. Natl. Acad. Sci. USA *80*:2026-2030), and the EBV-hybridoma technique (Cole *et al.*, 1985, Monoclonal Antibodies And Cancer Therapy, Alan R. Liss, Inc., pp. 77-96). Such antibodies may be of any immunoglobulin class including IgG, IgM, IgE, IgA, IgD and any subclass thereof. The hybridoma producing the mAb of this invention may be cultivated *in vitro* or *in vivo*. Production of high titers of mAbs *in vivo* makes this the presently preferred method of production.

In addition, techniques developed for the production of "chimeric antibodies" (Morrison *et al.*, 1984, Proc. Natl. Acad. Sci. USA, *81*:6851-6855; Neuberger *et al.*, 1984, Nature, *312*:604-608; Takeda *et al.*, 1985, Nature, *314*:452-454) by splicing the genes from a mouse antibody molecule of appropriate antigen specificity together with genes from a human antibody molecule of appropriate biological activity can be used. A chimeric antibody is a molecule in which different portions are derived from different animal species, such as those having a variable region derived from a porcine mAb and a human immunoglobulin constant region.

Alternatively, techniques described for the production of single chain antibodies (U.S. Patent 4,946,778; Bird, 1988, Science *242*:423-426; Huston *et al.*, 1988, Proc. Natl. Acad. Sci. USA *85*:5879-5883; and Ward *et al.*, 1989, Nature *334*:544-546) can be adapted to produce single chain antibodies against gene products of interest. Single chain antibodies are formed by linking the heavy and light chain fragments of the Fv region via an amino acid bridge, resulting in a single chain polypeptide.

Antibody fragments which recognize specific epitopes may be generated by known techniques. For example, such fragments include, but are not limited to: the $F(ab')_2$ fragments which can be produced by pepsin digestion of the antibody molecule and the Fab fragments which can be generated by reducing the disulfide bridges of the $F(ab')_2$ fragments. Alternatively, Fab expression libraries may be constructed (Huse *et al.*, 1989, Science,

246:1275-1281) to allow rapid and easy identification of monoclonal Fab fragments with the desired specificity.

Antibodies to peptides and proteins that are fully or at least partially encoded by the described GTSs, or fragments or truncated versions thereof, can in turn be utilized to generate anti-idiotypic antibodies that "mimic" an epitope of the peptide or protein of interest, using techniques well known to those skilled in the art. (See, *e.g.*, Greenspan & Bona, 1993, FASEB J *7(5)*:437-444; and Nissinoff, 1991, J. Immunol. *147(8)*:2429-2438). For example antibodies that bind to a regulatory peptide or protein of interest of the current invention and competitively inhibit the binding of such peptide or protein to any of its binding partners in the cell can be used to generate anti-idiotypes that "mimic" the peptide or protein of interest and, therefore, bind and neutralize the particular binding partner of the peptide or protein of interest. Such neutralizing antibodies, anti-idiotypes, Fab fragments of such antibodies, or humanized derivatives thereof, can be used in therapeutic regimens to mimic or neutralize (depending on the antibody) the effect of a particular peptide of interest, or a binding partner of a peptide or protein of interest.

5.5 DIAGNOSIS OF DISORDERS AFFECTING DEVELOPMENT AND CELL DIFFERENTIATION

A variety of methods can be employed for the diagnostic and prognostic evaluation of disorders involving developmental and differentiation processes, and for the identification of subjects having a predisposition to such disorders.

Such methods may, for example, utilize reagents such as the nucleotide sequences described above, and antibodies to peptides and proteins of the current invention, as described, in Section 5.4. Specifically, such reagents may be used, for example, for: (1) the detection of the presence of gene mutations, or the detection of either over- or under-expression of the respective mRNAs relative to the non-disorder state; (2) the detection of either an over- or an under-abundance of the respective gene product relative to the non-disorder state; and (3) the detection of perturbations or abnormalities in the intra- and inter-cellular processes mediated by the respective peptides or proteins of the current invention.

The methods described herein may be performed, for example, by utilizing pre-packaged diagnostic kits comprising at least one specific nucleotide sequence of the current invention or antibody reagent described herein, which may be conveniently used, *e.g.*, in clinical settings, to diagnose patients exhibiting developmental or cell differentiation disorder abnormalities.

For the detection of mutations in any of the genes described above, any nucleated cell can be used as a starting source for genomic nucleic acid. For the detection of gene expression or gene products, any cell type or tissue in which the gene of interest is expressed, such as, for example, ES cells, may be utilized. Specific examples of cells and tissues that can be analyzed using the claimed polynucleotides include, but are not limited to, endothelial cells, epithelial cells, islets, neurons or neural tissue, mesothelial cells, osteocytes, lymphocytes, chondrocytes, hematopoietic cells, immune cells, cells of the major glands or organs (e.g., lung, heart, stomach, pancreas, kidney, skin, etc.), exocrine and/or endocrine cells, embryonic and other stem cells, fibroblasts, and culture adapted and/or transformed versions of the above. Diseases or natural processes that can also be correlated with the expression of mutant, or normal, variants of the disclosed GTSs include, but are not limited to, aging, cancer, autoimmune disease, lupus, scleroderma, Crohn's disease, multiple sclerosis, inflammatory bowel disease, immune disorders, schizophrenia, psychosis, alopecia, glandular disorders, inflammatory disorders, ataxia telangiectasia, diabetes, skin disorders such as acne, eczema, and the like, osteo and rheumatoid arthritis, high blood pressure, atherosclerosis, cardiovascular disease, pulmonary disease, degenerative diseases of the neural or skeletal systems, Alzheimer's disease, Parkinson's disease, osteoporosis, asthma, developmental disorders or abnormalities, genetic birth defects, infertility, epithelial ulcerations, and viral, parasitic, fungal, yeast, or bacterial infection.

Primary, secondary, or culture-adapted variants of cancer cells/tissues can also be analyzed using the claimed polynucleotides. Examples of such cancers include, but are not limited to, Cardiac: sarcoma (angiosarcoma, fibrosarcoma, rhabdomyosarcoma, liposarcoma), myxoma, rhabdomyoma, fibroma, lipoma and teratoma; Lung: bronchogenic carcinoma (squamous cell, undifferentiated small cell, undifferentiated large cell, adenocarcinoma), alveolar (bronchiolar) carcinoma, bronchial adenoma, sarcoma, lymphoma, chondromatous

hamartoma, mesothelioma; Gastrointestinal: esophagus (squamous cell carcinoma, adenocarcinoma, leiomyosarcoma, lymphoma), stomach (carcinoma, lymphoma, leiomyosarcoma), pancreas (ductal adenocarcinoma, insulinoma, glucagonoma, gastrinoma, carcinoid tumors, vipoma), small bowel (adenocarcinoma, lymphoma, carcinoid tumors, Karposi's sarcoma, leiomyoma, hemangioma, lipoma, neurofibroma, fibroma), large bowel (adenocarcinoma, tubular adenoma, villous adenoma, hamartoma, leiomyoma); Genitourinary tract: kidney (adenocarcinoma, Wilm's tumor [nephroblastoma], lymphoma, leukemia), bladder and urethra (squamous cell carcinoma, transitional cell carcinoma, adenocarcinoma), prostate (adenocarcinoma, sarcoma), testis (seminoma, teratoma, embryonal carcinoma, teratocarcinoma, choriocarcinoma, sarcoma, interstitial cell carcinoma, fibroma, fibroadenoma, adenomatoid tumors, lipoma); Liver: hepatoma (hepatocellular carcinoma), cholangiocarcinoma, hepatoblastoma, angiosarcoma, hepatocellular adenoma, hemangioma; Bone: osteogenic sarcoma (osteosarcoma), fibrosarcoma, malignant fibrous histiocytoma, chondrosarcoma, Ewing's sarcoma, malignant lymphoma (reticulum cell sarcoma), multiple myeloma, malignant giant cell tumor, chordoma, osteochronfroma (osteocartilaginous exostoses), benign chondroma, chondroblastoma, chondromyxofibroma, osteoid osteoma and giant cell tumors; Nervous system: skull (osteoma, hemangioma, granuloma, xanthoma, osteitis deformans), meninges (meningioma, meningiosarcoma, gliomatosis), brain (astrocytoma, medulloblastoma, glioma, ependymoma, germinoma [pinealoma], glioblastoma multiforme, oligodendroglioma, schwannoma, retinoblastoma, congenital tumors), spinal cord (neurofibroma, meningioma, glioma, sarcoma); Gynecological: uterus (endometrial carcinoma), cervix (cervical carcinoma, pre-tumor cervical dysplasia), ovaries (ovarian carcinoma [serous cystadenocarcinoma, mucinous cystadenocarcinoma, endometrioid tumors, celioblastoma, clear cell carcinoma, unclassified carcinoma], granulosa-thecal cell tumors, Sertoli-Leydig cell tumors, dysgerminoma, malignant teratoma), vulva (squamous cell carcinoma, intraepithelial carcinoma, adenocarcinoma, fibrosarcoma, melanoma), vagina (clear cell carcinoma, squamous cell carcinoma, botryoid sarcoma [embryonal rhabdomyosarcoma], fallopian tubes (carcinoma); Hematologic: blood (myeloid leukemia [acute and chronic], acute lymphoblastic leukemia, chronic lymphocytic leukemia, myeloproliferative diseases, multiple myeloma, myelodysplastic syndrome), Hodgkin's

disease, non-Hodgkin's lymphoma [malignant lymphoma]; Skin: malignant melanoma, basal cell carcinoma, squamous cell carcinoma, Karposi's sarcoma, moles, dysplastic nevi, lipoma, angioma, dermatofibroma, keloids, psoriasis; Breast: carcinoma and sarcoma, and Adrenal glands: neuroblastoma.

Nucleic acid-based detection techniques and peptide detection techniques that can be used to conduct the above analyses are described below.

5.5.1. DETECTION OF THE GENES OF THE CURRENT INVENTION AND THEIR RESPECTIVE TRANSCRIPTS

Mutations within the genes of the current invention can be detected by utilizing a number of techniques. Nucleic acid from any nucleated cell can be used as the starting point for such assay techniques, and may be isolated according to standard nucleic acid preparation procedures which are well known to those of skill in the art.

DNA may be used in hybridization or amplification assays of biological samples to detect abnormalities involving gene structure, including point mutations, insertions, deletions and chromosomal rearrangements. Such assays may include, but are not limited to, Southern analyses, single stranded conformational polymorphism analyses (SSCP), and PCR analyses.

Such diagnostic methods for the detection of gene-specific mutations can involve for example, contacting and incubating nucleic acids including recombinant DNA molecules, cloned genes or degenerate variants thereof, obtained from a sample, *e.g.*, derived from a patient sample or other appropriate cellular source, with one or more labeled nucleic acid reagents including recombinant DNA molecules, cloned genes or degenerate variants thereof, as described above, under conditions favorable for the specific annealing of these reagents to their complementary sequences within the gene of interest of the current invention. Preferably, the lengths of these nucleic acid reagents are at least 15 to 30 nucleotides. After incubation, all non-annealed nucleic acids are removed from the nucleic acid molecule hybrid. The presence of nucleic acids which have hybridized, if any such molecules exist, is then detected. Using such a detection scheme, the nucleic acid from the cell type or tissue of interest can be immobilized, for example, to a solid support such as a membrane, or a plastic surface such as that on a microtiter plate or polystyrene beads. In this case, after incubation,

non-annealed, labeled nucleic acid reagents of the type described above are easily removed. Detection of the remaining, annealed, labeled nucleic acid reagents is accomplished using standard techniques well-known to those in the art. The gene sequences to which the nucleic acid reagents have annealed can be compared to the annealing pattern expected from a normal gene sequence in order to determine whether a gene mutation is present.

Alternative diagnostic methods for the detection of gene specific nucleic acid molecules, in patient samples or other appropriate cell sources, may involve their amplification, *e.g.*, by PCR (the experimental embodiment set forth in Mullis, K.B., 1987, U.S. Patent No. 4,683,202), followed by the detection of the amplified molecules using techniques well known to those of skill in the art. The resulting amplified sequences can be compared to those which would be expected if the nucleic acid being amplified contained only normal copies of the respective gene in order to determine whether a gene mutation exists.

Additionally, well-known genotyping techniques can be performed to identify individuals carrying mutations in any of the genes of the current invention. Such techniques include, for example, the use of restriction fragment length polymorphisms (RFLPs), which involve sequence variations in one of the recognition sites for the specific restriction enzyme used.

Furthermore, the polynucleotide sequences of the current invention may be mapped to chromosomes and specific regions of chromosomes using well known genetic and/or chromosomal mapping techniques. These techniques include *in situ* hybridization, linkage analysis against known chromosomal markers, hybridization screening with libraries or flow-sorted chromosomal preparations specific to known chromosomes, and the like. The technique of fluorescent *in situ* hybridization of chromosome spreads has been described, for example, in Verma *et al.* (1988) Human Chromosomes: A Manual of Basic Techniques, Pergamon Press, New York. Fluorescent *in situ* hybridization of chromosomal preparations and other physical chromosome mapping techniques may be correlated with additional genetic map data. Examples of genetic map data can be found, for example, in Genetic Maps: Locus Maps of Complex Genomes, Book 5: Human Maps, O'Brien, editor, Cold

Spring Harbor Laboratory Press (1990). Comparisons of physical chromosomal map data may be of particular interest in detecting genetic diseases in carrier states.

The level of expression of genes can also be assayed by detecting and measuring the transcription of such genes. For example, RNA from a cell type or tissue known, or suspected to express any of the genes of the current invention can be isolated and tested utilizing hybridization or PCR techniques (e.g., northern or RT PCR) such as those described, above. Such analyses may reveal both quantitative and qualitative aspects of the expression pattern of the respective gene, including activation or inactivation of gene expression. *In situ* hybridization using suitable radioactive labels, enzymatic labels, or chemically tagged forms of the described polynucleotide sequences can also be used to assess expression patterns *in vivo*.

Additionally, an oligonucleotide or polynucleotide sequence first disclosed in at least a portion of one of the GTS sequences of SEQ ID NOS:9-1008 can be used as a hybridization probe in conjunction with a solid support matrix/substrate (resins, beads, membranes, plastics, polymers, metal or metallized substrates, crystalline or polycrystalline substrates, etc.). Of particular note are spatially addressable arrays (*i.e.*, gene chips, microtiter plates, etc.) of oligonucleotides and polynucleotides, or corresponding oligopeptides and polypeptides, wherein at least one of the biopolymers present on the spatially addressable array comprises an oligonucleotide or polynucleotide sequence first disclosed in at least one of the GTS sequences of SEQ ID NOS:9-1008, or an amino acid sequence encoded thereby. Methods for attaching biopolymers to, or synthesizing biopolymers on, solid support matrices, and conducting binding studies thereon are disclosed in, *inter alia*, U.S. Patent Nos. 5,556,752, 5,744,305, 4,631,211, 5,445,934, 5,252,743, 4,713,326, 5,424,186, and 4,689,405 the disclosures of which are herein incorporated by reference in their entirety.

Oligonucleotides corresponding to the described GTSs can be used as hybridization probes either singly or in chip format. For example, a series of such GTS oligonucleotide sequences, or the complements thereof, can be used to represent all or a portion of the described GTS sequences. The oligonucleotides, typically between about 16 to about 40 (or any whole number within the stated range) nucleotides in length, may partially overlap each other and/or the NHP sequence may be represented using oligonucleotides that do not

overlap. Accordingly, the described NHP polynucleotide sequences shall typically comprise at least about two or three distinct oligonucleotide sequences of at least about 18, and preferably about 25, nucleotides in length that are first disclosed in the described Sequence Listing. Such oligonucleotide sequences may begin at any nucleotide present within a sequence in the Sequence Listing and proceed in either a sense (5'-to-3') orientation vis-a-vis the described sequence or in an antisense orientation.

Although the presently described GTSs have been specifically described using nucleotide sequence, it should be appreciated that each of the GTSs can uniquely be described using any of a wide variety of additional structural attributes, or combinations thereof. For example, a given GTS can be described by the net composition of the nucleotides present within a given region of the GTS in conjunction with the presence of one or more specific oligonucleotide sequence(s) first disclosed in the GTS. Alternatively, a restriction map specifying the relative positions of restriction endonuclease digestion sites, or various palindromic or other specific oligonucleotide sequences can be used to structurally describe a given GTS. Such restriction maps, which are typically generated by widely available computer programs (*e.g.*, the University of Wisconsin GCG sequence analysis package, SEQUENCHER 3.0, Gene Codes Corp., Ann Arbor, MI, etc.), can optionally be used in conjunction with one or more discrete nucleotide sequence(s) present in the GTS that can be described by the relative position of the sequence relative to one or more additional sequence(s) or one or more restriction sites present in the GTS.

5.5.2 DETECTION OF THE GENE PRODUCTS OF THE CURRENT INVENTION

Antibodies directed against wild type or mutant gene products of the current invention or conserved variants or peptide fragments thereof, which are discussed above in Section 5.4 may also be used as diagnostics and prognostics for disorders affecting development and cellular differentiation, as described herein. Such diagnostic methods, may be used to detect abnormalities in the level of gene expression, or abnormalities in the structure and/or temporal, tissue, cellular, or subcellular location of the respective gene product, and may be performed *in vivo* or *in vitro*, such as, for example, on biopsy tissue.

The tissue or cell type to be analyzed will generally include those which are known, or suspected, to contain cells that express the respective gene. The protein isolation methods employed herein may, for example, be such as those described in Harlow and Lane (Harlow, E. and Lane, D., 1988, "Antibodies: A Laboratory Manual", Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York), which is incorporated herein by reference in its entirety. The isolated cells can be derived from cell culture or from a patient. The analysis of cells taken from culture may be a necessary step in the assessment of cells that could be used as part of a cell-based gene therapy technique or, alternatively, to test the effect of compounds on the expression of the respective gene.

For example, antibodies, or fragments of antibodies, such as those described above in Section 5.4 are also useful in the present invention to quantitatively or qualitatively detect the presence of gene products of the current invention or conserved variants or peptide fragments thereof. This can be accomplished, for example, by immunofluorescence techniques employing a fluorescently labeled antibody (see below, this Section) coupled with light microscopic, flow cytometric, or fluorimetric detection.

The antibodies (or fragments thereof) or fusion or conjugated proteins useful in the present invention may, additionally, be employed histologically, as in immunofluorescence, immunoelectron microscopy or non-immuno assays, for *in situ* detection of gene products of the current invention or conserved variants or peptide fragments thereof, or for catalytic subunit binding (in the case of labeled catalytic subunit fusion protein).

In situ detection may be accomplished by removing a histological specimen from a patient, and applying thereto a labeled antibody or fusion protein of the present invention. The antibody (or fragment) or fusion protein is preferably applied by overlaying the labeled antibody (or fragment) onto a biological sample. Through the use of such a procedure, it is possible to determine not only the presence of the gene product of the current invention, or conserved variants or peptide fragments, but also its distribution in the examined tissue. Using the present invention, those of ordinary skill will readily perceive that any of a wide variety of histological methods (such as staining procedures) can be modified in order to achieve such *in situ* detection.

Immunoassays and non-immunoassays for gene products of the current invention or conserved variants or peptide fragments thereof will typically comprise incubating a sample, such as a biological fluid, a tissue extract, freshly harvested cells, or lysates of cells which have been incubated in cell culture, in the presence of a detectably labeled antibody capable of identifying the respective gene products of interest or conserved variants or peptide fragments thereof, and detecting the bound antibody by any of a number of techniques well-known in the art.

The biological sample may be brought in contact with and immobilized onto a solid phase support or carrier such as nitrocellulose, or other solid support which is capable of immobilizing cells, cell particles or soluble proteins. The support may then be washed with suitable buffers followed by treatment with the detectably labeled antibody specific to the peptide or protein of interest of the current invention or with fusion protein. The solid phase support may then be washed with the buffer a second time to remove unbound antibody or fusion protein. The amount of bound label on solid support may then be detected by conventional means.

"Solid phase support or carrier" is intended to encompass any support capable of binding an antigen or an antibody. Well-known supports or carriers include glass, polystyrene, polypropylene, polyethylene, dextran, nylon, amylases, natural and modified celluloses, polyacrylamides, gabbros, and magnetite. The nature of the carrier can be either soluble to some extent or insoluble for the purposes of the present invention. The support material may have virtually any possible structural configuration so long as the coupled molecule is capable of binding to an antigen or antibody. Thus, the support configuration may be spherical, as in a bead, or cylindrical, as in the inside surface of a test tube, or the external surface of a rod. Alternatively, the surface may be flat such as a sheet, test strip, etc. Preferred supports include polystyrene beads. Those skilled in the art will know many other suitable carriers for binding antibody or antigen, or will be able to ascertain the same by use of routine experimentation.

The binding activity of a given lot of antibody or fusion protein may be determined according to well known methods. Those skilled in the art will be able to determine operative and optimal assay conditions for each determination by employing routine experimentation.

With respect to antibodies, one of the ways in which the antibody can be detectably labeled is by linking the same to an enzyme and use in an enzyme immunoassay (EIA) (Voller, "The Enzyme Linked Immunosorbent Assay (ELISA)", 1978, Diagnostic Horizons *2*:1-7, Microbiological Associates Quarterly Publication, Walkersville, MD); Voller *et al.*, 1978, J. Clin. Pathol. *31*:507-520; Butler, 1981, Meth. Enzymol. *73*:482-523; Maggio (ed.), 1980, Enzyme Immunoassay, CRC Press, Boca Raton, FL,; Ishikawa *et al.*, (eds.), 1981, Enzyme Immunoassay, Kgaku Shoin, Tokyo). The enzyme which is bound to the antibody will react with an appropriate substrate, preferably a chromogenic substrate, in such a manner as to produce a chemical moiety which can be detected, for example, by spectrophotometric, fluorimetric or by visual means. Enzymes which can be used to detectably label the antibody include, but are not limited to, malate dehydrogenase, staphylococcal nuclease, delta-5-steroid isomerase, yeast alcohol dehydrogenase, alpha-glycerophosphate, dehydrogenase, triose phosphate isomerase, horseradish peroxidase, alkaline phosphatase, asparaginase, glucose oxidase, beta-galactosidase, ribonuclease, urease, catalase, glucose-6-phosphate dehydrogenase, glucoamylase and acetylcholinesterase. The detection can be accomplished by colorimetric methods which employ a chromogenic substrate for the enzyme. Detection may also be accomplished by visual comparison of the extent of enzymatic reaction of a substrate in comparison with similarly prepared standards.

Detection may also be accomplished using any of a variety of other immunoassays. For example, by radioactively labeling the antibodies or antibody fragments, it is possible to detect the peptide or protein of interest through the use of a radioimmunoassay (RIA) (see, for example, Weintraub, B., Principles of Radioimmunoassays, Seventh Training Course on Radioligand Assay Techniques, The Endocrine Society, March, 1986, which is incorporated by reference herein). The radioactive isotope can be detected by such means as the use of a gamma counter or a scintillation counter or by autoradiography.

It is also possible to label the antibody with a fluorescent compound. When the fluorescently labeled antibody is exposed to light of the proper wave length, its presence can then be detected due to fluorescence. Among the most commonly used fluorescent labeling compounds are fluorescein isothiocyanate, rhodamine, phycoerythrin, phycocyanin, allophycocyanin and fluorescamine.

The antibody can also be detectably labeled using fluorescence emitting metals such as ^{152}Eu, or others of the lanthanide series. These metals can be attached to the antibody using such metal chelating groups as diethylenetriaminepentacetic acid (DTPA) or ethylenediaminetetraacetic acid (EDTA).

The antibody also can be detectably labeled by coupling it to a chemiluminescent compound. The presence of the chemiluminescent-tagged antibody is then determined by detecting the presence of luminescence that arises during the course of a chemical reaction. Examples of particularly useful chemiluminescent labeling compounds are luminol, isoluminol, theromatic acridinium ester, imidazole, acridinium salt and oxalate ester.

Likewise, a bioluminescent compound may be used to label the antibody of the present invention. Bioluminescence is a type of chemiluminescence found in biological systems in, which a catalytic protein increases the efficiency of the chemiluminescent reaction. The presence of a bioluminescent protein is determined by detecting the presence of luminescence. Important bioluminescent compounds for labeling purposes include, but are not limited to, luciferin, luciferase and aequorin.

An additional use of a peptide or polypeptide encoded by an oligonucleotide or polynucleotide sequence first disclosed in at least one of the GTS sequences of SEQ ID NOS:9-1008 is by incorporating the sequence into a phage display, or other peptide library/binding, system that can be used to screen for proteins, or other ligands, that are capable of binding to an amino acid sequence encoded by an oligonucleotide or polynucleotide sequence first disclosed in at least one of the GTS sequences of SEQ ID NOS:9-1008 (see U.S. Patents Nos. 5,270,170, and 5,432,018, herein incorporated by reference in their entirety). Moreover, peptide arrays comprising a novel amino acid sequence corresponding to a portion of at least one of the polynucleotide sequences first disclosed in SEQ ID NOS:9-1008 can be generated and screened essentially as described in U.S. Patents Nos. 5,143,854, 5,405,783, and 5,252,743, the complete disclosures of which are herein incorporated by references.

Additionally, the presently described GTSs, or primers derived therefrom, can be used to screen spatially addressable arrays, or pools therefrom, of clones present in a full-length human cDNA library. The 96 well microtiter plate format is especially well-suited to the

screening, by PCR for example, of pooled subfractions of cDNA clones.

5.6 SCREENING ASSAYS FOR COMPOUNDS THAT MODULATE THE EXPRESSION OR ACTIVITY OF PEPTIDES AND PROTEINS OF THE CURRENT INVENTION

The following assays are designed to identify compounds that interact with (*e.g.*, bind to) peptides and proteins at least partially encoded by one of SEQ ID NOS:9-1008 (i.e. peptides or proteins of the current invention) compounds that interact with (*e.g.*, bind to) intracellular proteins that interact with peptides and proteins of the current invention, compounds that interfere with the interaction of peptides and proteins of the current invention with each other and with other intracellular proteins involved in developmental and cell differentiation processes, and to compounds which modulate the activity of genes of the current invention (*i.e.*, modulate the level of expression of genes of the current invention) or modulate the level of gene products of the current invention. Assays may additionally be utilized which identify compounds which bind to gene regulatory sequences (*e.g.*, promoter sequences) and which may modulate the expression of genes of the current invention. See *e.g.*, Platt, K.A., 1994, J. Biol. Chem. <u>269</u>:28558-28562, which is incorporated herein by reference in its entirety.

Compounds that can be screened in accordance with the invention include, but are not limited to, peptides, antibodies and fragments thereof, prostaglandins, lipids and other organic compounds (*e.g.*, terpines, peptidomimetics) that bind to the peptide or protein of interest of the current invention and either mimic the activity triggered by the natural ligand (*i.e.*, agonists) or inhibit the activity triggered by the natural ligand (*i.e.*, antagonists); as well as peptides, antibodies or fragments thereof, and other organic compounds that mimic the peptide or protein of interest of the current invention (or a portion thereof) and bind to and "neutralize" natural ligand.

Such compounds may include, but are not limited to, peptides such as, for example, soluble peptides, including but not limited to members of random peptide libraries (see, *e.g.*, Lam, K.S. *et al.*, 1991, Nature 354:82-84; Houghten, R. *et al.*, 1991, Nature 354:84-86), and combinatorial chemistry-derived molecular library peptides made of D- and/or L-configuration amino acids, phosphopeptides (including, but not limited to, members of

random or partially degenerate, directed phosphopeptide libraries; see, *e.g.*, Songyang, Z. *et al.*, 1993, Cell 72:767-778); antibodies (including, but not limited to, polyclonal, monoclonal, humanized, anti-idiotypic, chimeric or single chain antibodies, and Fab, $F(ab')_2$ and Fab expression library fragments, and epitope-binding fragments thereof); and small organic or inorganic molecules.

Other compounds that can be screened in accordance with the invention include, but are not limited to, small organic molecules that are able to gain entry into an appropriate cell (*e.g.*, in ES cells) and affect the expression of a gene of the current invention or some other gene involved in development and cell differentiation (*e.g.*, by interacting with the regulatory region or transcription factors involved in gene expression); or such compounds that affect the activity of the peptide or protein of interest of the current invention, *e.g.*, by inhibiting or enhancing the binding of such peptide or protein to another cellular peptide or protein, or other factor, necessary for catalysis, signal transduction, or the like, that is involved in developmental or cell differentiation processes.

Computer modeling and searching technologies permit the identification of compounds, or the improvement of already identified compounds, that can modulate the expression or activity of peptides or proteins of interest of the current invention. Having identified such a compound or composition, the active sites or regions are identified. Such active sites might typically be the binding partner sites, such as, for example, the interaction domains of the peptides and proteins of the current invention with their respective binding partners. The active site can be identified using methods known in the art including, for example, from study of the amino acid sequences of peptides, from the nucleotide sequences of nucleic acids, or from study of complexes of the relevant compound or composition with its natural ligand. In the latter case, chemical or X-ray crystallographic methods can be used to find the active site by finding where on the factor the complexed ligand is found.

Next, the three dimensional geometric structure of the active site is determined. This can be done by known methods, including X-ray crystallography, which can determine a complete molecular structure. On the other hand, solid or liquid phase NMR can be used to determine certain intra-molecular distances. Any other experimental method of structure determination can be used to obtain partial or complete geometric structures. The geometric

structures may be measured with a complexed ligand, natural or artificial, which may increase the accuracy of the active site structure determined.

If an incomplete or insufficiently accurate structure is determined, the methods of computer based numerical modeling can be used to complete the structure or improve its accuracy. Any recognized modeling method may be used, including parameterized models specific to particular biopolymers such as proteins or nucleic acids, molecular dynamics models based on computing molecular motions, statistical mechanics models based on thermal ensembles, or combined models. For most types of models, standard molecular force fields, representing the forces between constituent atoms and groups, are necessary, and can be selected from force fields known in physical chemistry. The incomplete or less accurate experimental structures can serve as constraints on the complete and more accurate structures computed by these modeling methods.

Finally, having determined the structure of the active site, either experimentally, by modeling, or by a combination, candidate modulating compounds can be identified by searching databases containing compounds along with information on their molecular structure. Such a search seeks compounds having structures that match the determined active site structure and that interact with the groups defining the active site. Such a search can be manual, but is preferably computer assisted. These compounds found from this search are potential modulating compounds of the peptides and proteins of interest of the current invention.

Alternatively, these methods can be used to identify improved modulating compounds from an already known modulating compound or ligand. The composition of the known compound can be modified and the structural effects of modification can be determined using the experimental and computer modeling methods described above applied to the new composition. The altered structure is then compared to the active site structure of the compound to determine if an improved fit or interaction results. In this manner, systematic variations in composition, such as by varying side groups, can be quickly evaluated to obtain modified modulating compounds or ligands of improved specificity or activity.

Further experimental and computer modeling methods useful to identify modulating compounds based upon identification of the active sites of peptides and proteins of interest of

the current invention, and related factors involved in development, cellular differentiation, and other cellular processes will be apparent to those of skill in the art.

Examples of molecular modeling systems are the CHARM and QUANTA programs (Polygon Corporation, Waltham, MA). CHARM performs the energy minimization and molecular dynamics functions. QUANTA performs the construction, graphic modeling and analysis of molecular structure. QUANTA allows interactive construction, modification, visualization, and analysis of the behavior of molecules with each other.

A number of articles review computer modeling of drugs interactive with specific proteins, such as Rotivinen *et al.*, 1988, Acta Pharmaceutical Fennica *97*:159-166; Ripka, New Scientist 54-57 (June 16, 1988); McKinaly and Rossmann, 1989, Annu. Rev. Pharmacol. Toxicol. *29*:111-122; Perry and Davies, OSAR: Quantitative Structure-Activity Relationships in Drug Design pp. 189-193 (Alan R. Liss, Inc. 1989); Lewis and Dean, 1989, Proc. R. Soc. Lond. *236*:125-140 and 141-162; and, with respect to a model receptor for nucleic acid components, Askew *et al.*, 1989, J. Am. Chem. Soc. *111*:1082-1090. Other computer programs that screen and graphically depict chemicals are available from companies such as BioDesign, Inc. (Pasadena, CA.), Allelix, Inc. (Mississauga, Ontario, Canada), and Hypercube, Inc. (Cambridge, Ontario). Although these are primarily designed for application to drugs specific to particular proteins, they can be adapted to the design of drugs specific to regions of DNA or RNA, once that region is identified.

Although described above with reference to design and generation of compounds which could alter binding, one could also screen libraries of known compounds, including natural products or synthetic chemicals, and biologically active materials, including proteins, for compounds which are inhibitors or activators.

Compounds identified via assays such as those described herein may be useful, for example, in elaborating the biological function of the gene products of interest of the current invention and for ameliorating disorders affecting development and cell differentiation. Assays for testing the effectiveness of compounds, identified by, for example, techniques such as those described below.

5.6.1. *IN VITRO* SCREENING ASSAYS FOR COMPOUNDS THAT BIND TO PEPTIDES AND PROTEINS OF THE CURRENT INVENTION

In vitro systems may be designed to identify compounds capable of interacting with (*e.g.*, binding to) peptides and proteins of interest of the current invention, fragments thereof, and variants thereof. The identified compounds can be useful, for example, in modulating the activity of wild type and/or mutant gene products of the current invention; may be utilized in screens for identifying compounds that disrupt normal interactions of the peptides and proteins of the current invention with other factors, like, for example, other peptides and proteins; or may in themselves disrupt such interactions.

The principle of the assays used to identify compounds that bind to the peptides and proteins of the current invention involves preparing a reaction mixture of the peptides and proteins of interest that are disclosed by the current invention and a test compound under conditions and for a time sufficient to allow the two components to interact and bind, thus forming a complex that can be removed from and/or detected in the reaction mixture. The peptides and proteins of the current invention used can vary depending upon the goal of the screening assay. For example, where agonists of the natural ligand are sought, the full length peptide or protein of interest, or a fusion protein containing the subunit of interest fused to a protein or polypeptide that affords advantages in the assay system (*e.g.*, labeling, isolation of the resulting complex, etc.) can be utilized.

The screening assays can be conducted in a variety of ways. For example, one method of conducting such an assay involves anchoring the peptide or protein of interest, or a fragment or fusion protein thereof, or the test substance onto a solid phase and detecting peptide or protein of interest/test compound complexes anchored on the solid phase at the end of the reaction. In one embodiment of such a method, the peptide or protein of interest may be anchored onto a solid surface, and the test compound, which is not anchored, may be labeled, either directly or indirectly. In another embodiment of the method, a peptide or protein of interest of the current invention anchored on the solid phase is complexed with a natural ligand of such peptide or protein of interest. Then, a test compound could be assayed for its ability to disrupt the association of the complex.

In practice, microtiter plates may conveniently be utilized as the solid phase. The anchored component may be immobilized by non-covalent or covalent attachments. Non-covalent attachment may be accomplished by simply coating the solid surface with a solution of the protein and drying. Alternatively, an immobilized antibody, preferably a monoclonal antibody, specific for the peptide or protein to be immobilized may be used to anchor the peptide or protein to the solid surface. The surfaces may be prepared in advance and stored.

In order to conduct the assay, the nonimmobilized component is added to the coated surface containing the anchored component. After the reaction is complete, unreacted components are removed (*e.g.*, by washing) under conditions such that any complexes formed will remain immobilized on the solid surface. The detection of complexes anchored on the solid surface can be accomplished in a number of ways. Where the previously nonimmobilized component is pre-labeled, the detection of label immobilized on the surface indicates that complexes were formed. Where the previously nonimmobilized component is not pre-labeled, an indirect label can be used to detect complexes anchored on the surface; *e.g.*, using a labeled antibody specific for the previously nonimmobilized component (the antibody, in turn, may be directly labeled or indirectly labeled with a labeled anti-Ig antibody).

Alternatively, a reaction can be conducted in a liquid phase, the reaction products separated from unreacted components, and complexes detected; *e.g.*, using an immobilized antibody specific for one component of complexes formed, like, for example, the peptide or protein of interest of the current invention or the test compound to anchor any complexes formed in solution, and a labeled antibody specific for the other component of the possible complex to detect anchored complexes.

5.6.2 ASSAYS FOR INTRACELLULAR PROTEINS THAT INTERACT WITH THE PEPTIDES AND PROTEINS OF THE CURRENT INVENTION

Any method suitable for detecting protein-protein interactions may be employed for identifying intracellular peptides and proteins that interact with peptides and proteins of the current invention. Among the traditional methods which may be employed are co-immunoprecipitation, crosslinking and co-purification through gradients or

chromatographic columns of cell lysates or proteins obtained from cell lysates and the peptides and proteins of the current invention to identify proteins in the lysate that interact with those peptides and proteins of the current invention. For these assays, the peptides and proteins of the current invention may be used in full length, or in truncated or modified forms or as fusion-proteins. Similarly, the component may be a complex of two or more of the peptides and proteins of the current invention. Once isolated, such an intracellular protein can be identified and can, in turn, be used in conjunction with standard techniques to identify proteins with which it interacts. For example, at least a portion of the amino acid sequence of an intracellular protein which interacts with a peptide or protein of the current invention, can be ascertained using techniques well known to those of skill in the art, such as via the Edman degradation technique. (See, *e.g.*, Creighton, 1983, "Proteins: Structures and Molecular Principles", W.H. Freeman & Co., N.Y., pp.34-49). The amino acid sequence obtained may be used as a guide for the generation of oligonucleotide mixtures that can be used to screen for gene sequences encoding such intracellular proteins. Screening may be accomplished, for example, by standard hybridization or PCR techniques. Techniques for the generation of oligonucleotide mixtures and the screening are well-known. (See, *e.g.*, Ausubel, <u>supra.</u>, and PCR Protocols: A Guide to Methods and Applications, 1990, Innis, M. *et al.*, eds. Academic Press, Inc., New York).

Additionally, methods may be employed which result in the simultaneous identification of genes which encode the intracellular proteins interacting with peptides and proteins of the current invention. These methods include, for example, probing expression libraries, in a manner similar to the well known technique of antibody probing of ëgt11 libraries, using a labeled form of a peptide or protein of the current invention, or a fusion protein, *e.g.*, a peptide or protein at least partially encoded by a GTS of the present invention fused to a marker (*e.g.*, an enzyme, fluor, luminescent protein, or dye), or an Ig-Fc domain.

One method that detects protein interactions *in vivo*, the two-hybrid system, is described in detail for illustration only and not by way of limitation. One version of this system has been described (Chien *et al.*, 1991, Proc. Natl. Acad. Sci. USA, 88:9578-9582) and is commercially available from Clontech (Palo Alto, CA).

Briefly, utilizing such a system, plasmids are constructed that encode two hybrid proteins: one plasmid consists of nucleotides encoding the DNA-binding domain of a transcription activator protein fused to a nucleotide sequence of the current invention encoding a peptide or protein of the current invention, a modified or truncated form or a fusion protein, and the other plasmid consists of nucleotides encoding the transcription activator protein's activation domain fused to a cDNA encoding an unknown protein which has been recombined into this plasmid as part of a cDNA library. The DNA-binding domain fusion plasmid and the cDNA library are transformed into a strain of the yeast *Saccharomyces cerevisiae* that contains a reporter gene (*e.g.*, HBS or *lacZ*) whose regulatory region contains the transcription activator's binding site. Either hybrid protein alone cannot activate transcription of the reporter gene; the DNA-binding domain hybrid cannot because it does not provide activation function, and the activation domain hybrid cannot because it cannot localize to the activator's binding sites. Interaction of the two hybrid proteins reconstitutes the functional activator protein and results in expression of the reporter gene, which is detected by an assay for the reporter gene product.

The two-hybrid system or related methodology may be used to screen activation domain libraries for proteins that interact with the "bait" gene product. By way of example, and not by way of limitation, a peptide or protein of the current invention may be used as the bait gene product. Total genomic or cDNA sequences are fused to the DNA encoding an activation domain. This library and a plasmid encoding a hybrid of a bait gene product of the current invention fused to the DNA-binding domain are cotransformed into a yeast reporter strain, and the resulting transformants are screened for those that express the reporter gene. For example, and not by way of limitation, a bait gene sequence of the current invention can be cloned into a vector such that it is translationally fused to the DNA encoding the DNA-binding domain of the GAL4 protein. These colonies are purified and the library plasmids responsible for reporter gene expression are isolated. DNA sequencing is then used to identify the proteins encoded by the library plasmids.

A cDNA library of the cell line from which proteins that interact with bait gene product of the current invention are to be detected can be made using methods routinely practiced in the art. According to the particular system described herein, for example, the

cDNA fragments can be inserted into a vector such that they are translationally fused to the transcriptional activation domain of GAL4. This library can be co-transfected along with the bait gene-GAL4 fusion plasmid into a yeast strain which contains a lacZ gene driven by a promoter which contains GAL4 activation sequence. A cDNA encoded protein, fused to GAL4 transcriptional activation domain, that interacts with bait gene product will reconstitute an active GAL4 protein and thereby drive expression of the HIS3 gene. Colonies which express HIS3 can be detected by their growth on petri dishes containing semi-solid agar based media lacking histidine. The cDNA can then be purified from these strains, and used to produce and isolate the bait gene-interacting protein using techniques routinely practiced in the art.

5.6.3 ASSAYS FOR COMPOUNDS THAT INTERFERE WITH INTERACTIONS OF THE PEPTIDES AND PROTEINS OF THE CURRENT INVENTION WITH INTRACELLULAR MACROMOLECULES

The macromolecules that interact with the peptides and proteins of the current invention are referred to, for purposes of this discussion, as "binding partners". These binding partners are likely to be involved in catalytic reactions or signal transduction pathways, and therefore, in the role of the peptides and proteins of the current invention in development and cell differentiation. It is also desirable to identify compounds that interfere with or disrupt the interaction of such binding partners with the peptides and proteins of the current invention which may be useful in regulating the activity of the peptides and proteins of the current invention and thus control development and cell differentiation disorders associated with the activity of the peptides and proteins of the current invention.

The basic principle of the assay systems used to identify compounds that interfere with the interaction between the peptides and proteins of the current invention and its binding partner or partners involves preparing a reaction mixture containing the peptides or proteins of the current invention of interest, modified or truncated version thereof, or fusion proteins thereof as described above, and the binding partner under conditions and for a time sufficient to allow the two to interact and bind, thus forming a complex. In order to test a compound for inhibitory activity, the reaction mixture is prepared in the presence and absence of the test

compound. The test compound may be initially included in the reaction mixture, or may be added at a time subsequent to the addition of the peptide or protein of the current invention and its binding partner. Control reaction mixtures are incubated without the test compound or with a placebo. The formation of any complexes between the peptide or protein of the current invention and the binding partner is then detected. The formation of a complex in the control reaction, but not in the reaction mixture containing the test compound, indicates that the compound interferes with the interaction of the peptide or protein at least partially encoded by a GTS of the present invention and the interactive binding partner. Additionally, complex formation within reaction mixtures containing the test compound and normal peptide or protein of the current invention may also be compared to complex formation within reaction mixtures containing the test compound and a mutant peptide or protein of the current invention. This comparison can be important in those cases wherein it is desirable to identify compounds that disrupt interactions of mutant but not normal forms of a peptide or protein of the current invention.

The assay for compounds that interfere with the interaction of a peptide or protein of the current invention and binding partners can be conducted in a heterogeneous or homogeneous format. Heterogeneous assays involve anchoring either the peptide or protein of the current invention or the binding partner onto a solid phase and detecting complexes anchored on the solid phase at the end of the reaction. In homogeneous assays, the entire reaction is carried out in a liquid phase. In either approach, the order of addition of reactants can be varied to obtain different information about the compounds being tested. For example, test compounds that interfere with the interaction by competition can be identified by conducting the reaction in the presence of the test substance; *i.e.*, by adding the test substance to the reaction mixture prior to or simultaneously with the peptide or protein of the current invention and interactive binding partner. Alternatively, test compounds that disrupt preformed complexes, *e.g.* compounds with higher binding constants that displace one of the components from the complex, can be tested by adding the test compound to the reaction mixture after complexes have been formed. The various formats are described briefly below.

In a heterogeneous assay system, either the peptide or protein of the current invention or the interactive binding partner, is anchored onto a solid surface, while the non-anchored

species is labeled either directly or indirectly. In practice, microtiter plates are conveniently utilized. The anchored species may be immobilized by non-covalent or covalent attachments. Non-covalent attachment may be accomplished simply by coating the solid surface with a solution of the peptide or protein of the current invention or binding partner and drying. Alternatively, an immobilized antibody specific for the species to be anchored may be used to anchor the species to the solid surface. The surfaces may be prepared in advance and stored.

In order to conduct the assay, the partner of the immobilized species is exposed to the coated surface with or without the test compound. After the reaction is complete, unreacted components are removed (*e.g.*, by washing) and any complexes formed will remain immobilized on the solid surface. The detection of complexes anchored on the solid surface can be accomplished in a number of ways. Where the non-immobilized species is pre-labeled, the detection of label immobilized on the surface indicates that complexes were formed. Where the non-immobilized species is not pre-labeled, an indirect label can be used to detect complexes anchored on the surface; *e.g.*, using a labeled antibody specific for the initially non-immobilized species (the antibody, in turn, may be directly labeled or indirectly labeled with a labeled anti-Ig antibody). Depending upon the order of addition of reaction components, test compounds which inhibit complex formation or which disrupt preformed complexes can be detected.

Alternatively, the reaction can be conducted in a liquid phase in the presence or absence of the test compound, the reaction products separated from unreacted components, and complexes detected; *e.g.*, using an immobilized antibody specific for one of the binding components to anchor any complexes formed in solution, and a labeled antibody specific for the other partner to detect anchored complexes. Again, depending upon the order of addition of reactants to the liquid phase, test compounds which inhibit complex or which disrupt preformed complexes can be identified.

In an alternate embodiment of the invention, a homogeneous assay can be used. In this approach, a preformed complex of the peptide or protein of the current invention and the interactive binding partner is prepared in which either the peptide or protein of the current invention or its binding partner is labeled, but the signal generated by the label is quenched due to formation of the complex (see, *e.g.*, U.S. Patent No. 4,109,496 by Rubenstein which

utilizes this approach for immunoassays). The addition of a test substance that competes with and displaces one of the species from the preformed complex will result in the generation of a signal above background. In this way, test substances which disrupt peptide or protein of the current invention/intracellular binding partner interaction can be identified.

In a particular embodiment, a peptide or protein of the current invention can be prepared for immobilization. For example, the peptide or protein of the current invention or a fragment thereof can be fused to a glutathione-S-transferase (GST) gene using a fusion vector, such as pGEX-5X-1, in such a manner that its binding activity is maintained in the resulting fusion protein. The interactive binding partner can be purified and used to raise a monoclonal antibody, using methods routinely practiced in the art and described above. This antibody can be labeled with the radioactive isotope ^{125}I, for example, by methods routinely practiced in the art. In a heterogeneous assay, *e.g.*, the GST-peptide or protein of the current invention fusion protein can be anchored to glutathione-agarose beads. The interactive binding partner can then be added in the presence or absence of the test compound in a manner that allows interaction and binding to occur. At the end of the reaction period, unbound material can be washed away, and the labeled monoclonal antibody can be added to the system and allowed to bind to the complexed components. The interaction between the peptide or protein of the current invention and the interactive binding partner can be detected by measuring the amount of radioactivity that remains associated with the glutathione-agarose beads. A successful inhibition of the interaction by the test compound will result in a decrease in measured radioactivity.

Alternatively, the GST-peptide or protein of the current invention fusion protein and the interactive binding partner can be mixed together in liquid in the absence of the solid glutathione-agarose beads. The test compound can be added either during or after the species are allowed to interact. This mixture can then be added to the glutathione-agarose beads and unbound material is washed away. Again the extent of inhibition of the peptide or protein of the current invention/binding partner interaction can be detected by adding the labeled antibody and measuring the radioactivity associated with the beads.

In another embodiment of the invention, these same techniques can be employed using peptide fragments that correspond to the binding domains of a peptide or protein of the

current invention and/or the interactive or binding partner (in cases where the binding partner is a protein) in place of one or both of the full length proteins. Any number of methods routinely practiced in the art can be used to identify and isolate the binding sites. These methods include, but are not limited to, mutagenesis of the gene encoding one of the proteins and screening for disruption of binding in a co-immunoprecipitation assay. Compensating mutations in the gene encoding the second species in the complex can then be selected. Sequence analysis of the genes encoding the respective proteins will reveal the mutations that correspond to the region of the protein involved in interactive binding. Alternatively, one protein can be anchored to a solid surface using methods described above, and allowed to interact with and bind to its labeled binding partner, which has been treated with a proteolytic enzyme, such as trypsin. After washing, a short, labeled peptide comprising the binding domain may remain associated with the solid material, which can be isolated and identified by amino acid sequencing. Also, once the gene coding for the intracellular binding partner is obtained, short gene segments can be engineered to express peptide fragments of the protein, which can then be tested for binding activity and purified or synthesized.

For example, and not by way of limitation, a peptide or protein of the current invention can be anchored to a solid material as described, above, by making a GST-peptide or protein of the current invention fusion protein and allowing it to bind to glutathione agarose beads. The interactive binding partner can be labeled with a radioactive isotope, such as ^{35}S, and cleaved with a proteolytic enzyme such as trypsin. Cleavage products can then be added to the anchored GST-peptide or protein of the current invention fusion protein and allowed to bind. After washing away unbound peptides, labeled bound material, representing the intracellular binding partner binding domain, can be eluted, purified, and analyzed for amino acid sequence by well-known methods. Peptides so identified can be produced synthetically or fused to appropriate facilitative proteins using recombinant DNA technology.

5.6.4 ASSAYS FOR IDENTIFICATION OF COMPOUNDS THAT AMELIORATE DISORDERS AFFECTING DEVELOPMENT AND CELL DIFFERENTIATION

Compounds including, but not limited to, binding compounds identified via assay techniques such as those described above, can be tested for the ability to ameliorate

development and cell differentiation disorder symptoms. The assays described above can identify compounds which affect the activity of peptides and proteins of the current invention (*e.g.*, compounds that bind to the peptides and proteins of the current invention, inhibit binding of their natural ligands, and compounds that bind to a natural ligand of the peptides and proteins of the current invention and neutralize the ligand activity); or compounds that affect the activity of genes encoding peptides and proteins of the current invention (by affecting the expression of those genes, including molecules, *e.g.*, proteins or small organic molecules, that affect or interfere with splicing events so that expression of the genes of interest can be modulated). However, it should be noted that the assays described herein can also identify compounds that modulate signal transduction or catalytic events that the peptides and proteins of the current invention are involved in. The identification and use of such compounds which affect a step in, for example, signal transduction pathways or catalytic events in which any of the peptides and proteins of the current invention are involved in, may modulate the effect of the peptides and proteins of the current invention on developmental or cell differentiation disorders. Such identification and use of such compounds are within the scope of the invention. Such compounds can be used as part of a therapeutic method for the treatment of developmental and cell differentiation disorders.

The invention encompasses cell-based and animal model-based assays for the identification of compounds exhibiting such an ability to ameliorate developmental and cell differentiation disorder symptoms. Such cell-based assay systems can also be used as the standard to assay for purity and potency of the natural ligand, catalytic subunit, including recombinantly or synthetically produced catalytic subunit and catalytic subunit mutants.

Cell-based systems can be used to identify compounds which may act to ameliorate developmental or cell differentiation disorder symptoms. Such cell systems can include, for example, recombinant or non-recombinant cells, such as cell lines, which express the gene encoding the peptide or protein of interest of the current invention. For example ES cells, or cell lines derived from ES cells can be used. In addition, expression host cells (*e.g.*, COS cells, CHO cells, fibroblasts, Sf9 cells) genetically engineered to express a functional peptide or protein of the current invention in addition to factors necessary for the peptide or protein of

the current invention to fulfil its physiological role of, for example, signal transduction or catalyses, can be used as an end point in the assay.

In utilizing such cell systems, cells may be exposed to a compound suspected of exhibiting an ability to ameliorate developmental or cell differentiation disorder symptoms, at a sufficient concentration and for a time sufficient to elicit such an amelioration of such disorder symptoms in the exposed cells. After exposure, the cells can be assayed to measure alterations in the expression of the gene encoding the peptide or protein of interest of the current invention, *e.g.*, by assaying cell lysates for the appropriate mRNA transcripts (*e.g.*, by Northern analysis) or for expression of the peptide or protein of interest of the current invention in the cell; compounds which regulate or modulate expression of the gene encoding the peptide or protein of interest of the current invention are valuable candidates as therapeutics. Alternatively, the cells are examined to determine whether one or more developmental or cell differentiation disorder-like cellular phenotypes has been altered to resemble a more normal or more wild type phenotype, or a phenotype more likely to produce a lower incidence or severity of disorder symptoms. Still further, the expression and/or activity of components of pathways or functionally or physiologically connected peptides or proteins of which the peptide or protein of interest of the current invention is a part, can be assayed.

For example, after exposure of the cells, cell lysates can be assayed for the presence of increased levels of the test compound as compared to lysates derived from unexposed control cells. The ability of a test compound to inhibit production of the assay compound such systems indicates that the test compound inhibits signal transduction initiated by the peptide or protein of interest of the current invention. Finally, a change in cellular morphology of intact cells may be assayed using techniques well known to those of skill in the art.

In addition, animal-based development or cell differentiation disorder systems, which may include, for example, mice, may be used to identify compounds capable of ameliorating development or cell differentiation disorder-like symptoms. Such animal models may be used as test systems for the identification of drugs, pharmaceuticals, therapies and interventions which may be effective in treating such disorders. For example, animal models may be exposed to a compound, suspected of exhibiting an ability to ameliorate development

or cell differentiation disorder symptoms, at a sufficient concentration and for a time sufficient to elicit such an amelioration of development and/or cell differentiation disorder symptoms in the exposed animals. The response of the animals to the exposure may be monitored by assessing the reversal of disorders associated with development and/or cell differentiation disorders. With regard to intervention, any treatments which reverse any aspect of development or cell differentiation disorder-like symptoms should be considered as candidates for human development and/or cell differentiation disorder therapeutic intervention. Dosages of test agents may be determined by deriving dose-response curves, as discussed below.

5.7 THE TREATMENT OF DISORDERS ASSOCIATED WITH STIMULATION OF PEPTIDES AND PROTEINS OF THE CURRENT INVENTION

The invention also encompasses methods and compositions for modifying development and cell differentiation and treating development and cell differentiation disorders. For example, one may decrease the level of expression of one or more genes of the current invention, and/or downregulate activity of one or more of the peptides or proteins of interest of the current invention. Thereby, the response of cells, like, for example, ES cells, to factors which activate the physiological responses that enhance the pathological processes leading to developmental and cell differentiation disorders may be reduced and the symptoms ameliorated. Conversely, the response of cells, like, for example, ES cells, to physiological stimuli involving any of the peptides or proteins of the current invention and necessary for proper developmental and cell differentiation processes may be augmented by increasing the activity of one or several of the peptides or proteins of interest of the current invention. Different approaches are discussed below.

5.7.1 INHIBITION OF PEPTIDES AND PROTEINS OF THE CURRENT INVENTION TO REDUCE DEVELOPMENT AND CELL DIFFERENTIATION DISORDERS

Any method which neutralizes the catalytic or signal transduction activity of the peptides and proteins of the current invention or which inhibits expression of the genes

encoding peptides and proteins (either transcription or translation) can be used to reduce symptoms associated with developmental and cell differentiation disorders.

In one embodiment, immuno therapy can be designed to reduce the level of endogenous gene expression for the peptides and proteins of the current invention, *e.g.*, using antisense or ribozyme approaches to inhibit or prevent translation of mRNA transcripts; triple helix approaches to inhibit transcription of the genes; or targeted homologous recombination to inactivate or "knock out" the genes or its endogenous promoter.

Antisense approaches involve the design of oligonucleotides (either DNA or RNA) that are complementary to mRNA specific for peptides and proteins of interest of the current invention. The antisense oligonucleotides will bind to the complementary mRNA transcripts and prevent translation. Absolute complementarity, although preferred, is not required. A sequence "complementary" to a portion of an RNA, as referred to herein, means a sequence having sufficient complementarity to be able to hybridize with the RNA, forming a stable duplex. In the case of double-stranded antisense nucleic acids, a single strand of the duplex DNA may thus be tested, or triplex formation may be assayed. The ability to hybridize will depend on both the degree of complementarity and the length of the antisense nucleic acid. Generally, the longer the hybridizing nucleic acid, the more base mismatches with an RNA it may contain and still form a stable duplex (or triplex, as the case may be). One skilled in the art can ascertain a tolerable degree of mismatch by use of standard procedures to determine the melting point of the hybridized complex.

Oligonucleotides that are complementary to the 5' end of the message, *e.g.*, the 5' untranslated sequence up to and including the AUG initiation codon, should work most efficiently at inhibiting translation. However, sequences complementary to the 3' untranslated sequences of mRNAs have recently shown to be effective at inhibiting translation of mRNAs as well. See generally, Wagner, R., 1994, Nature *372*:333-335. Thus, oligonucleotides complementary to either the 5'- or 3'- non- translated, non-coding regions of the mRNAs specific for the peptides and proteins of the current invention could be used in an antisense approach to inhibit translation of those endogenous mRNAs. Oligonucleotides complementary to the 5' untranslated region of the mRNA should include the complement of the AUG start codon. Antisense oligonucleotides complementary to mRNA coding regions

are less efficient inhibitors of translation but could be used in accordance with the invention. Whether designed to hybridize to the 5'-, 3'- or coding region of an mRNA, antisense nucleic acids should be at least six nucleotides in length, and are preferably oligonucleotides ranging from 6 to about 50 nucleotides in length. In specific aspects the oligonucleotide is at least 10 nucleotides, at least 17 nucleotides, at least 25 nucleotides or at least 50 nucleotides.

Regardless of the choice of target sequence, it is preferred that *in vitro* studies are first performed to quantitate the ability of the antisense oligonucleotide to inhibit gene expression. It is preferred that these studies utilize controls that distinguish between antisense gene inhibition and nonspecific biological effects of oligonucleotides. It is also preferred that these studies compare levels of the target RNA or protein with that of an internal control RNA or protein. Additionally, it is envisioned that results obtained using the antisense oligonucleotide are compared with those obtained using a control oligonucleotide. It is preferred that the control oligonucleotide is of approximately the same length as the test oligonucleotide and that the nucleotide sequence of the oligonucleotide differs from the antisense sequence no more than is necessary to prevent specific hybridization to the target sequence.

The oligonucleotides can be DNA or RNA or chimeric mixtures or derivatives or modified versions thereof, single-stranded or double-stranded. The oligonucleotide can be modified at the base moiety, sugar moiety, or phosphate backbone, for example, to improve stability of the molecule, hybridization, etc. The oligonucleotide may include other appended groups such as peptides (*e.g.*, for targeting host cell receptors *in vivo*), or agents facilitating transport across the cell membrane (see, e.g., Letsinger *et al.*, 1989, Proc. Natl. Acad. Sci. U.S.A. *86*:6553-6556; Lemaitre *et al.*, 1987, Proc. Natl. Acad. Sci. *84*:648-652; PCT Publication No. WO88/09810, published December 15, 1988), or hybridization-triggered cleavage agents. (See, e.g., Krol *et al.*, 1988, BioTechniques *6*:958-976) or intercalating agents. (See, *e.g.*, Zon, 1988, Pharm. Res. 5:539-549). To this end, the oligonucleotide may be conjugated to another molecule, *e.g.*, a peptide, hybridization triggered cross-linking agent, transport agent, hybridization-triggered cleavage agent, etc.

The antisense oligonucleotide may comprise at least one modified base moiety which is selected from the group including, but not limited to, 5-fluorouracil, 5-bromouracil,

5-chlorouracil, 5-iodouracil, hypoxanthine, xantine, 4-acetylcytosine, 5-(carboxyhydroxylmethyl) uracil, 5-carboxymethylaminomethyl-2-thiouridine, 5-carboxymethylaminomethyluracil, dihydrouracil, beta-D-galactosylqueosine, inosine, N6-isopentenyladenine, 1-methylguanine, 1-methylinosine, 2,2-dimethylguanine, 2-methyladenine, 2-methylguanine, 3-methylcytosine, 5-methylcytosine, N6-adenine, 7-methylguanine, 5-methylaminomethyluracil, 5-methoxyaminomethyl-2-thiouracil, beta-D-mannosylqueosine, 5′-methoxycarboxymethyluracil, 5-methoxyuracil, 2-methylthio-N6-isopentenyladenine, uracil-5-oxyacetic acid (v), wybutoxosine, pseudouracil, queosine, 2-thiocytosine, 5-methyl-2-thiouracil, 2-thiouracil, 4-thiouracil, 5-methyluracil, uracil-5-oxyacetic acid methylester, uracil-5-oxyacetic acid (v), 5-methyl-2-thiouracil, 3-(3-amino-3-N-2-carboxypropyl) uracil, (acp3)w, and 2,6-diaminopurine.

The antisense oligonucleotide may also comprise at least one modified sugar moiety selected from the group including, but not limited to, arabinose, 2-fluoroarabinose, xylulose, and hexose.

In another embodiment, the antisense oligonucleotide comprises at least one modified phosphate backbone selected from the group consisting of a phosphorothioate, a phosphorodithioate, a phosphoramidothioate, a phosphoramidate, a phosphordiamidate, a methylphosphonate, an alkyl phosphotriester, and a formacetal or analog thereof.

In yet another embodiment, the antisense oligonucleotide is an alpha-anomeric oligonucleotide. An alpha-anomeric oligonucleotide forms specific double-stranded hybrids with complementary RNA in which, contrary to the usual alpha-units, the strands run parallel to each other (Gautier *et al.*, 1987, Nucl. Acids Res. *15*:6625-6641). The oligonucleotide is a 2′-0-methylribonucleotide (Inoue *et al.*, 1987, Nucl. Acids Res. *15*:6131-6148), or a chimeric RNA-DNA analogue (Inoue *et al.*, 1987, FEBS Lett. *215*:327-330).

Oligonucleotides of the invention may be synthesized by standard methods known in the art, *e.g.* by use of an automated DNA synthesizer (such as are commercially available from Biosearch, Applied Biosystems, etc.). As examples, phosphorothioate oligonucleotides may be synthesized by the method of Stein *et al.*, 1988, Nucl. Acids Res. *16*:3209. Methylphosphonate oligonucleotides can be prepared by use of controlled pore glass polymer supports (Sarin *et al.*, 1988, Proc. Natl. Acad. Sci. U.S.A. *85*:7448-7451).

While antisense nucleotides complementary to the coding region sequence specific for the peptides and proteins of the current invention could be used, those complementary to the transcribed untranslated region are most preferred.

The antisense molecules should be delivered to cells which express the peptides and proteins of interest of the current invention *in vivo*, like, for example, ES cells. A number of methods have been developed for delivering antisense DNA or RNA to cells; *e.g.*, antisense molecules can be injected directly into the tissue or cell derivation site, or modified antisense molecules, designed to target the desired cells (*e.g.*, antisense linked to peptides or antibodies that specifically bind receptors or antigens expressed on the target cell surface) can be administered systemically.

However, it is often difficult to achieve intracellular concentrations of antisense molecules that are sufficient to suppress translation of endogenous mRNAs. Therefore a preferred approach utilizes a recombinant DNA construct in which the antisense oligonucleotide is placed under the control of a strong pol III or pol II promoter. The use of such a construct to transfect target cells in the patient will result in the transcription of sufficient amounts of single stranded RNAs that will form complementary base pairs with the endogenous transcripts specific for the peptides and proteins of interest of the current invention and thereby prevent translation of the respective mRNAs. For example, a vector can be introduced *in vivo* such that it is taken up by a cell and directs the transcription of an antisense RNA. Such a vector can remain episomal or become chromosomally integrated, as long as it can be transcribed to produce the desired antisense RNA. Such vectors can be constructed by recombinant DNA technology methods standard in the art. Vectors can be plasmid, viral, or others known in the art, used for replication and expression in mammalian cells. Expression of the sequence encoding the antisense RNA can be by any promoter known in the art to act in mammalian, preferably human cells. Such promoters can be inducible or constitutive. Such promoters include, but are not limited to: the SV40 early promoter region (Bernoist and Chambon, 1981, Nature 290:304-310), the promoter contained in the 3′ long terminal repeat of Rous sarcoma virus (Yamamoto *et al.*, 1980, Cell 22:787-797), the herpes thymidine kinase promoter (Wagner *et al.*, 1981, Proc. Natl. Acad. Sci. U.S.A. 78:1441-1445), the regulatory sequences of the metallothionein gene (Brinster *et al.*,

1982, Nature 296:39-42), etc. Any type of plasmid, cosmid, YAC or viral vector can be used to prepare the recombinant DNA construct which can be introduced directly into the tissue or cell derivation site; *e.g.*, the bone marrow. Alternatively, viral vectors can be used which selectively infect the desired tissue or cell type; (*e.g.*, viruses which infect cells of hematopoietic lineage), in which case administration may be accomplished by another route (*e.g.*, systemically).

Ribozyme molecules designed to catalytically cleave mRNA transcripts specific for the peptides and proteins of interest of the current invention can also be used to prevent translation of the mRNAs of interest and expression of the peptides and proteins encoded by those mRNAs. (See, *e.g.*, PCT International Publication WO90/11364, published October 4, 1990; Sarver *et al.*, 1990, Science 247:1222-1225). While ribozymes that cleave mRNA at site specific recognition sequences can be used to destroy mRNAs, the use of hammerhead ribozymes is preferred. Hammerhead ribozymes cleave mRNAs at locations dictated by flanking regions that form complementary base pairs with the target mRNA. The sole requirement is that the target mRNA have the following sequence of two bases: 5'-UG-3'. The construction and production of hammerhead ribozymes is well known in the art and is described more fully in Haseloff and Gerlach, 1988, Nature, *334*:585-591. Preferably the ribozyme is engineered so that the cleavage recognition site is located near the 5' end of the mRNA of interest; *i.e.*, to increase efficiency and minimize the intracellular accumulation of non-functional mRNA transcripts.

The ribozymes of the present invention also include RNA endoribonucleases (hereinafter "Cech-type ribozymes") such as the one which occurs naturally in Tetrahymena Thermophila (known as the IVS, or L-19 IVS RNA) and which has been extensively described by Thomas Cech and collaborators (Zaug *et al.*, 1984, Science, *224*:574-578; Zaug and Cech, 1986, Science, *231*:470-475; Zaug *et al.*, 1986, Nature, *324*:429-433; published International Patent Application No. WO 88/04300 by University Patents Inc.; Been and Cech, 1986, Cell, *47*:207-216). The Cech-type ribozymes have an eight base pair active site which hybridizes to a target RNA sequence where after cleavage of the target RNA takes place. The invention encompasses those Cech-type ribozymes which target eight base-pair

active site sequences that are present in the mRNAs specific for the peptides and proteins of interest of the current invention.

As in the antisense approach, the ribozymes can be composed of modified oligonucleotides (*e.g.* for improved stability, targeting, etc.) and should be delivered to cells which express the peptides and proteins of interest of the current invention *in vivo*, like, for example, ES cells. A preferred method of delivery involves using a DNA construct "encoding" the ribozyme under the control of a strong constitutive pol III or pol II promoter, so that transfected cells will produce sufficient quantities of the ribozyme to destroy the endogenous messages specific for the peptides and proteins of interest of the current invention and inhibit translation. Because ribozymes unlike antisense molecules, are catalytic, a lower intracellular concentration is required for efficiency.

Endogenous gene expression can also be reduced by inactivating or "knocking out" the gene of interest specific for a peptide or protein of the current invention or its promoter using targeted homologous recombination. (*e.g.*, see Smithies *et al.*, 1985, Nature *317*:230-234; Thomas & Capecchi, 1987, Cell *51*:503-512; Thompson *et al.*, 1989 Cell *5*:313-321; each of which is incorporated by reference herein in its entirety). For example, a mutant, non-functional peptide or protein of interest of the current invention (or a completely unrelated DNA sequence) flanked by DNA homologous to the endogenous gene encoding said peptide or protein of interest of the current invention (either the coding regions or regulatory regions of the gene) can be used, with or without a selectable marker and/or a negative selectable marker, to transfect cells that express said peptide or protein of interest of the current invention *in vivo*. Insertion of the DNA construct, via targeted homologous recombination, results in inactivation of the targeted endogenous gene. Such approaches are particularly suited in the agricultural field where modifications to ES cells can be used to generate animal offspring with an inactive copy of a gene encoding a peptide or protein of interest of the current invention (*e.g.*, see Thomas & Capecchi 1987 and Thompson 1989, supra). However this approach can be adapted for use in humans provided the recombinant DNA constructs are directly administered or targeted to the required site *in vivo* using appropriate viral vectors.

Alternatively, endogenous expression of a gene of interest can be reduced by targeting deoxyribonucleotide sequences complementary to the regulatory region of said gene (*i.e.*, the promoter and/or enhancers) to form triple helical structures that prevent transcription of the gene of interest in target cells in the body. (See generally, Helene, C. 1991, Anticancer Drug Des., *6(6)*:569-84; Helene, C. *et al.*, 1992, Ann, N.Y. Acad. Sci., *660*:27-36; and Maher, L.J., 1992, Bioassays *14(12)*:807-15).

In yet another embodiment of the invention, the activity of a peptide or protein of interest of the current invention can be reduced using a "dominant negative" approach. A dominant negative approach takes advantage of the interaction of the peptides or proteins of interest with other peptides or proteins to form complexes, the formation of which is a prerequisite for the peptide or protein of interest of the current invention to exert its physiological activity. To this end, constructs which encode a defective form of the peptide or protein of interest of the current invention can be used in gene therapy approaches to diminish the activity of said peptide or protein of interest in appropriate target cells. Alternatively, targeted homologous recombination can be utilized to introduce such deletions or mutations into the subject's endogenous gene encoding the peptide or protein of interest of the current invention in the appropriate tissue. The engineered cells will express non-functional copies of the peptide or protein of interest of the current invention, thereby downregulating its activity *in vivo*. Such engineered cells should demonstrate a diminished response to physiological stimuli of the activity of the affected peptide or protein of interest of the current invention, resulting in reduction of the development or cell differentiation disorder phenotype.

5.7.2 RESTORATION OR INCREASE IN EXPRESSION OR ACTIVITY OF A PEPTIDE OR PROTEIN OF THE CURRENT INVENTION TO PROMOTE DEVELOPMENT OR CELL DIFFERENTIATION

With respect to an increase in the level of normal gene expression and/or gene product activity specific for any of the peptides and proteins of interest of the current invention, the respective nucleic acid sequences can be utilized for the treatment of development and cell differentiation disorders. Where the cause of the development or cell differentiation

dysfunction is a defective peptide or protein of the current invention, treatment can be administered, for example, in the form of gene delivery or gene therapy. Specifically, one or more copies of a normal gene or a portion of the gene that directs the production of a gene product exhibiting normal function of the appropriate peptide or protein of the current invention, may be inserted into the appropriate cells within a patient or animal subject, optionally using suitable vectors. Recombinant retroviruses have been widely used in gene transfer or gene delivery experiments and even human clinical trials (see generally, Mulligan, R.C., Chapter 8, In: Experimental Manipulation of Gene Expression, Academic Press, pp. 155-173 (1983); Coffin, J., In: RNA Tumor Viruses, Weiss, R. *et al.* (eds.), Cold Spring Harbor Laboratory, Vol. 2, pp. 36-38 (1985). Other eucaryotic viruses which have been used as vectors to transduce mammalian cells include adenovirus, papilloma virus, herpes virus, adeno-associated virus, vaccinia virus, rabies virus, and the like (See generally, Sambrook *et al.*, Molecular Cloning, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York, Vol. *3*:16.1-16.89 (1989). Alternatively, cationic or other lipids may be employed to deliver polynucleotides comprising (or including) the described GTS sequences to patients. Additionally, naked DNA comprising one or more GTS sequences, optionally modified by the addition of one or more of, in operable combination and orientation, a promoter, an enhancer, a ribosome entry or ribosome binding site, and/or an in-frame translation initiation codon can be employed to deliver GTSs to a patient. Another use of the above constructs includes "naked" DNA vaccines that can be introduced *in vivo* alone, or in conjunction with excipients, or microcarrier spheres, nanoparticles or other supporting or dosaging compounds or molecules.

The gene replacement/delivery therapies described above should be capable of delivering gene sequences to the cell types within patients which express the peptide or protein of interest of the current invention. Alternatively, targeted homologous recombination can be utilized to correct the defective endogenous gene in the appropriate cell type. In animals, targeted homologous recombination can be used to correct the defect in ES cells in order to generate offspring with a corrected trait.

Finally, compounds identified in the assays described above that stimulate, enhance, or modify the activity of the peptides and proteins of the current invention can be used to

achieve proper development and cell differentiation. The formulation and mode of administration will depend upon the physico-chemical properties of the compound.

5.8 PHARMACEUTICAL PREPARATIONS AND METHODS OF ADMINISTRATION

Compounds that are determined to affect gene expression of the peptides and proteins of the current invention, comprise nucleotide sequence information that is at least partially first disclosed in the Sequence Listing (*i.e.*, sequences used in antisense, gene therapy, dsRNA, or ribozyme applications), or the interaction of such peptides and proteins with any of their binding partners, can be administered to a patient at therapeutically effective doses to treat or ameliorate development and cell differentiation disorders. A therapeutically effective dose refers to that amount of the compound sufficient to result in any amelioration or retardation of disease symptoms, or development and cell differentiation or proliferation disorders.

5.8.1 EFFECTIVE DOSE

Toxicity and therapeutic efficacy of such compounds can be determined by standard pharmaceutical procedures in cell cultures or experimental animals, *e.g.*, for determining the LD_{50} (the dose lethal to 50% of the population) and the ED_{50} (the dose therapeutically effective in 50% of the population). The dose ratio between toxic and therapeutic effects is the therapeutic index and it can be expressed as the ratio LD_{50}/ED_{50}. Compounds which exhibit large therapeutic indices are preferred. While compounds that exhibit toxic side effects may be used, care should be taken to design a delivery system that targets such compounds to the site of affected tissue in order to minimize potential damage to uninfected cells and, thereby, reduce side effects.

The data obtained from the cell culture assays and animal studies can be used in formulating a range of dosage for use in humans. The dosage of such compounds lies preferably within a range of circulating concentrations that include the ED_{50} with little or no toxicity. The dosage may vary within this range depending upon the dosage form employed and the route of administration utilized. For any compound used in the method of the

invention, the therapeutically effective dose can be estimated initially from cell culture assays. A dose may be formulated in animal models to achieve a circulating plasma concentration range that includes the IC_{50} (*i.e.*, the concentration of the test compound which achieves a half-maximal inhibition of symptoms) as determined in cell culture. Such information can be used to more accurately determine useful doses in humans. Levels in plasma may be measured, for example, by high performance liquid chromatography.

When the therapeutic treatment of disease is contemplated, the appropriate dosage may also be determined using animal studies to determine the maximal tolerable dose, or MTD, of a bioactive agent per kilogram weight of the test subject. In general, at least one animal species tested is mammalian. Those skilled in the art regularly extrapolate doses for efficacy and avoiding toxicity to other species, including human. Before human studies of efficacy are undertaken, Phase I clinical studies in normal subjects help establish safe doses.

Additionally, the bioactive agent may be complexed with a variety of well established compounds or structures that, for instance, enhance the stability of the bioactive agent, or otherwise enhance its pharmacological properties (e.g., increase *in vivo* half-life, reduce toxicity, etc.).

The above therapeutic agents will be administered by any number of methods known to those of ordinary skill in the art including, but not limited to, administration by inhalation; by subcutaneous (sub-q), intravenous (I.V.), intraperitoneal (I.P.), intramuscular (I.M.), or intrathecal injection; or as a topically applied agent (transderm, ointments, creams, salves, eye drops, and the like).

5.8.2 <u>FORMULATIONS AND USE</u>

Pharmaceutical compositions for use in accordance with the present invention may be formulated in conventional manner using one or more physiologically acceptable carriers or excipients.

Thus, the compounds and their physiologically acceptable salts and solvates may be formulated for administration by inhalation or insufflation (either through the mouth or the nose) or oral, buccal, parenteral or rectal administration.

For oral administration, the pharmaceutical compositions may take the form of, for example, tablets or capsules prepared by conventional means with pharmaceutically acceptable excipients such as binding agents (*e.g.*, pregelatinised maize starch, polyvinylpyrrolidone or hydroxypropyl methylcellulose); fillers (*e.g.*, lactose, microcrystalline cellulose or calcium hydrogen phosphate); lubricants (*e.g.*, magnesium stearate, talc or silica); disintegrants (*e.g.*, potato starch or sodium starch glycolate); or wetting agents (*e.g.*, sodium lauryl sulphate). The tablets may be coated by methods well known in the art. Liquid preparations for oral administration may take the form of, for example, solutions, syrups or suspensions, or they may be presented as a dry product for constitution with water or other suitable vehicle before use. Such liquid preparations may be prepared by conventional means with pharmaceutically acceptable additives such as suspending agents (*e.g.*, sorbitol syrup, cellulose derivatives or hydrogenated edible fats); emulsifying agents (*e.g.*, lecithin or acacia); non-aqueous vehicles (*e.g.*, almond oil, oily esters, ethyl alcohol or fractionated vegetable oils); and preservatives (*e.g.*, methyl or propyl-p-hydroxybenzoates or sorbic acid). The preparations may also contain buffer salts, flavoring, coloring and sweetening agents as appropriate.

Preparations for oral administration may be suitably formulated to give controlled release of the active compound.

For buccal administration the compositions may take the form of tablets or lozenges formulated in conventional manner.

For administration by inhalation, the compounds for use according to the present invention are conveniently delivered in the form of an aerosol spray presentation from pressurized packs or a nebulizer, with the use of a suitable propellant, *e.g.*, dichlorodifluoromethane, trichlorofluoromethane, dichlorotetrafluoroethane, carbon dioxide or other suitable gas. In the case of a pressurized aerosol, the dosage unit may be determined by providing a valve to deliver a metered amount. Capsules and cartridges of *e.g.* gelatin for use in an inhaler or insufflator may be formulated containing a powder mix of the compound and a suitable powder base such as lactose or starch.

The compounds may be formulated for parenteral administration by injection, *e.g.*, by bolus injection or continuous infusion. Formulations for injection may be presented in unit

dosage form, *e.g.*, in ampules or in multi-dose containers, with an added preservative. The compositions may take such forms as suspensions, solutions or emulsions in oily or aqueous vehicles, and may contain formulatory agents such as suspending, stabilizing and/or dispersing agents. Alternatively, the active ingredient may be in powder form for constitution with a suitable vehicle, *e.g.*, sterile pyrogen-free water, before use.

The compounds may also be formulated as compositions for rectal administration such as suppositories or retention enemas, *e.g.*, containing conventional suppository bases such as cocoa butter or other glycerides.

In addition to the formulations described previously, the compounds may also be formulated as a depot preparation. Such long acting formulations may be administered by implantation (for example subcutaneously or intramuscularly) or by intramuscular injection. Thus, for example, the compounds may be formulated with suitable polymeric or hydrophobic materials (for example as an emulsion in an acceptable oil) or ion exchange resins, or as sparingly soluble derivatives, for example, as a sparingly soluble salt. The compositions may, if desired, be presented in a pack or dispenser device which may contain one or more unit dosage forms containing the active ingredient. The pack may, for example, comprise metal or plastic foil, such as a blister pack. The pack or dispenser device may be accompanied by instructions for administration.

The examples below are provided to illustrate the subject invention. These examples are provided by way of illustration and are not included for the purpose of limiting the invention in any way whatsoever.

6. EXAMPLES

6.1 CONSTRUCTION OF TRAPPED cDNA LIBRARIES

The GTSs represented in SEQ ID NOS:9-1008 were generated using normalized cDNA libraries produced as described in U.S. application Ser. No. 60/095,989, filed August 10, 1998 entitled "Construction of Normalized cDNA Libraries From Animal Cells" (also identified as attorney docket no. 8535-021-888), by Nehls *et al.*, the disclosure of which is herein incorporated by reference in its entirety.

Figure 1A provides a representative illustration of the retroviral vector used to produce the described polynucleotides. In brief, pools of modified human PA-1 teratocarcinoma cells (*e.g.*, PA-2, PA-1 that has been transfected to express the murine ecotropic retrovirus receptor) were typically infected at an m.o.i. between about 0.01 and about 0.1 (although much higher m.o.i.'s such as 1 to more than 10 could have been used). Figure 1B schematically shows how the target cell genomic locus is presumably mutated by the integration of the retroviral construct into intronic sequences of the cellular gene. The integrated retrovirus results in the generation of two chimeric transcripts. As illustrated in Figure 1C, the first chimeric transcript is a fusion between the coding region of the resistance marker (*neo* was used to produce the presently described GTSs) carried within the transgenic construct and the downstream exon(s) from the cellular gene. A mature transcript is generated when the indicated splice donor (SD) and splice acceptor (SA) sites are spliced. Translation of this fusion transcript produces the protein encoded by the resistance marker and allows for selection of gene trapped target cells, although selection is not required to produce the described polynucleotides.

Another chimeric transcript is shown in Figure 1C. This transcript is a fusion between the first exon of the transgenic construct (EXON1- the first exon of the murine *btk* gene was used as the sequence acquisition component for the described GTSs) and downstream exons from the cellular genome. Unlike the transcript encoding the selectable marker exon, the transcript encoding EXON1 is transcribed under the control of a vector encoded, and hence exogenously added, promoter (such as the PGK promoter), and the corresponding mRNA is generated by splicing between the indicated SD and SA sites. The region encoding the sequence acquisition exon (EXON1) has also been engineered to incorporate a unique sequence that permits the selective enrichment of the fusion transcript using molecular biological methods such as, for example, the polymerase chain reaction (PCR). These sequences serve as unique primer binding sites for EXON1-specific PCR amplification of the transcript and can additionally incorporate one or several rare-cutter endonuclease restriction sites to allow site-specific cloning. These features allow for the efficient and preferential cloning of transgene expressed fusion transcripts from pools of target cells relative to the background of cellularly encoded transcripts.

Based on the unique sequence present in EXON1, that is schematically indicated as a rare-cutter (A) restriction site in Figure 1B, selective cloning of the fusion transcript is achieved as shown in Figure 1D. cDNA was generated by reverse transcribing isolated RNA from pools of cells that have undergone independent gene trap events using, for example, RTT-1 as a deoxyoligonucleotide primer. The 3' end of the RTT-1 primer consisted of a homopolymeric stretch of deoxythymidine residues that bound to the polyadenylated end of the mRNA. At its 5' end, the oligonucleotide contained a sequence that can serve as a binding site for a second and a third primer (GET-2 and GET-2N). In the center, RTT-1 contains the sequence of a second rare-cutter (B) restriction site. Depending on the size of the pool and the transcriptional levels of the fusion transcript, second strand synthesis was carried out either with deoxyoligonucleotide primer BTK-1 using Klenow polymerase or by a polymerase chain reaction (PCR) in the presence of primers BTK-1 and GET-2.

The second strand reaction products that were generated by PCR were digested with restriction endonucleases that recognize their corresponding restriction site (*e.g.*, A and B). Additionally, PCR conditions were suitably modified using a variety of established procedures for enhancing the size of the PCR products. Such methods are described, inter alia, in U.S. Patent No. 5,556,772, and/or the PanVera (Madison, WI) New Technologies for Biomedical Research catalog (1997/98) both of which are herein incorporated by reference.

Prior to cloning, the PCR cDNA fragments were size-selected using conventional methods such as, for example, chromatography, gel-electrophoresis, and the like. Alternatively or in addition to this size selection, the PCR templates could have been previously size selected into separate template pools.

After digestion with suitable restriction enzymes, and size selection as described above, the cleaved cDNAs were directionally cloned into phage vectors (see Figure 1D), although any other cloning vector/vehicle could have been used. Such vectors are generically referred to as gene trapped sequence vectors, or "GTS vectors" in Figure 1D), preferably incorporating a multiple cloning site with restriction sites corresponding to those incorporated into the amplified cDNAs (*e.g.*, *Sfi* I, which allows for directional cloning of the cDNAs). After cloning, the resulting phage were handled as a conventional cDNA library using

standard procedures. Individual colonies and/or plaques were picked and used to generate PCR derived (using the primers indicated below) templates for DNA sequencing reactions.

A more detailed description of the above follows. The *btk* gene trap vector was introduced into human PA-2 cells using standard techniques. In brief, vector/virus containing supernatant from GP+E or AM12 packaging cells was added to approximately 50,000 cells (at an input ratio between about 0.1 and about 0.1 virus/target cell) for between about 16 to about 24 hours, and the cells were subsequently selected with G418 at active concentration of about 400 micrograms/ml for about 10 days. Between about 600 and about 3,000 G418 resistant colonies were subsequently pooled, and subjected to RNA isolation, reverse transcription, PCR, restriction digestion, size selection, and subcloning into lambda phage vectors. Individual phage plaques were directly amplified, purified, and sequenced to obtain the corresponding GTS.

When selection is not used, about 1 x 10^6 cells (PA-2, Hela, HepG2, or Jurkatt cells) per 100 mm dish were plated and infected with AM12 packaged *btk* retrovirus at an m.o.i. of approximately .01. After a 16 h incubation, the cells were washed in PBS and grown in culture media for four days. RNA from each plate was extracted, reverse transcribed, and the resulting cDNA was subject to two rounds of PCR, each for 25 cycles. The resulting PCR products were digested with Sfi and separated by gel electrophoresis. Six size fractions (between about 300 and about 4,000 bp) were recovered and each fraction was ligated into lambdaGT10Sfi arms, *in vitro* packaged, and plated for lysis. Individual plaques were picked from the plates, subject to an additional round of PCR, and subsequently sequenced to obtain the described GTSs. The particulars are described in greater detail below.

Figure 1 shows the chimeric fusion transcript that is formed when the first exon of the transgenic construct (EXON1- the first exon of the murine *btk* gene was used as the sequence acquisition component for the described GTSs) is spliced to downstream exons from the cellular genome. Unlike the transcript encoding the selectable marker exon, the transcript encoding EXON1 is transcribed under the control of a vector encoded, and hence exogenously added, promoter (such as the PGK promoter), and the corresponding mRNA is generated by splicing between the indicated SD and SA sites. The region encoding the sequence acquisition exon (EXON1) has also been engineered to incorporate a unique

sequence that permits the selective enrichment of the fusion transcript using molecular biological methods such as, for example, the polymerase chain reaction (PCR). These sequences serve as unique primer binding sites for EXON1-specific PCR amplification of the transcript and can additionally incorporate one or several rare-cutter endonuclease restriction sites to allow site-specific cloning. These features allow for the efficient and preferential cloning of transgene expressed fusion transcripts from pools of target cells relative to the background of cellularly encoded transcripts.

Based on the unique sequence present in EXON1, that is schematically indicated as a rare-cutter (A) restriction site in Figure 1B, selective cloning of the fusion transcript is achieved as shown in Figure 1D. cDNA was generated by reverse transcribing isolated RNA from pools of cells that have undergone independent gene trap events using, for example, RTT-1 as a deoxyoligonucleotide primer. The 3' end of the RTT-1 primer consisted of a homopolymeric stretch of deoxythymidine residues that bound to the polyadenylated end of the mRNA. At its 5' end, the oligonucleotide contained a sequence that can serve as a binding site for a second and a third primer (GET-2 and GET-2N). In the center, RTT-1 contains the sequence of a second rare-cutter (B) restriction site. Depending on the size of the pool and the transcriptional levels of the fusion transcript, second strand synthesis was carried out either with deoxyoligonucleotide primer BTK-1 using Klenow polymerase or by a polymerase chain reaction (PCR) in the presence of primers BTK-1 and GET-2.

The second strand reaction products that were generated by PCR were digested with restriction endonucleases that recognize their corresponding restriction site (*e.g.*, A and B). Additionally, PCR conditions were suitably modified using a variety of established procedures for enhancing the size of the PCR products. Such methods are described, inter alia, in U.S. Patent No. 5,556,772, and/or the PanVera (Madison, WI) New Technologies for Biomedical Research catalog (1997/98) both of which are herein incorporated by reference.

Prior to cloning, the PCR cDNA fragments were size-selected using conventional methods such as, for example, chromatography, gel-electrophoresis, and the like. Alternatively or in addition to this size selection, the PCR templates could have been previously size selected into separate template pools.

After digestion with suitable restriction enzymes, and size selection as described above, the cleaved cDNAs were directionally cloned into phage vectors (see Figure 1D), although any other cloning vector/vehicle could have been used. Such vectors are generically referred to as gene trapped sequence vectors, or "GTS vectors" in Figure 1D), preferably incorporating a multiple cloning site with restriction sites corresponding to those incorporated into the amplified cDNAs (*e.g.*, *Sfi* I, which allows for directional cloning of the cDNAs). After cloning, the resulting phage were handled as a conventional cDNA library using standard procedures. Individual colonies and/or plaques were picked and used to generate PCR derived (using the primers indicated below) templates for DNA sequencing reactions.

Total cell RNA isolation was conducted using RNAzol (Friendswood, TX, 77546) per the manufacturer's specifications. An RT premix containing 2X First Strand buffer, 100mM Tris-HCl, pH 8.3, 150mM KCl, 6mM $MgCl_2$, 2mM dNTPs, RNAGuard (1.5 units/reaction, Pharmacia), 20mM DTT, RTT-1 primer (3pmol/rxn, GenoSys Biotechnologies, sequence: 5' tggctaggccccaggataggcctcgctggccttttttttttttttt 3', SEQ ID NO:1) and Superscript II enzyme (200 units/rxn, Life Technologies) was added. The plate/tube was transferred to a thermal cycler for the RT reaction (37° C for 5 min. 42° C for 30 min. and 55° C for 10 min).

The cDNA was amplified using two distinct, and preferably nested, stages of PCR. The PCR premix contained: 1.1X MGBII buffer (74 mM Tris pH 8.8, 18.3mM Ammonium Sulfate, 7.4mM $MgCl_2$, 5.5mM 2ME, 0.011% Gelatin), 11.1% DMSO (Sigma), 1.67mM τdNTPS, Taq (5 units/rxn), water and primers. The sequences of the first round primers are: BTK-1 5' gccatggctccggtaggtccagag 3', SEQ ID NO:2 (GET-2, 5' tggctaggccccaggatag 3', SEQ ID NO:3), (about 7 pmol/rxn). The sequences of the second round primers are BTK-4 5' gtccagagatggccatagc 3', SEQ ID NO:4 (GET-2N 5' ccaggataggcctcgctg 3', SEQ ID NO:5), (used at about 20 pmol/rxn). The outer premix was added to an aliquot of cDNA and run for 20 cycles (94° C for 45 sec., 56° C for 60 sec 72° C for 2-4 min). An aliquot of this product was added to the inner premix and cycled at the same temperatures 20 times.

The PCR products of the second amplification series were extracted using phenol/chloroform, chloroform, and isopropanol precipitated in the presence of glycogen/sodium acetate. After centrifugation, the nucleic acid pellets were washed with 70 percent ethanol and were resuspended in TE, pH 8. After digestion with *Sfi* I at 55° C, the

digested products were loaded onto 0.8% agarose gels and size-selected using DEAE membranes as described (Sambrook *et al.*, 1989, *supra*). Generally, six approximate size-fractions (<700 bp, 700-900 bp, 900-1,300 bp, 1,300-1,600 bp, 1,600-2,000 bp, >2,000 bp) were separately ligated into GTS vector arms that were engineered to contain the corresponding *Sfi* I "A" and "B" specific overhangs (*i.e.*, TAG and GCG, respectively). The ligation products were packaged using commercially available lambda packaging extracts (Promega), and plated using *E. coli* strain C600 using conventional procedures (Sambrook *et al.*, 1989, *supra*). Individual plaques were directly picked into 40 microliters of PCR buffer and subjected to 35 cycles of PCR [at 94° C for 45 sec., 56° C for 60 sec 72° C for 1-3 min (depending on the size fraction)] using 12 pmol of the primers SEQ-4, 5' tacagtttttcttgtgaagattg 3', SEQ ID NO:6 and SEQ-5, 5' gggtagtccccaccttttg 3', SEQ ID NO:7, per PCR reaction. The cloned 3' RACE products were purified using an S300 column equilibrated in STE essentially as described in Nehls *et al.,* 1993, TIG,*9*:336-337, and the products were recovered by centrifugation at 1,200 x g for 5 min. This step removes unincorporated nucleotides, oligonucleotides, and primer-dimers. The PCR products were subsequently applied to a 0.25 ml bed of Sephadex® G-50 (DNA Grade, Pharmacia Biotech AB) that was equilibrated in MilliQ H_2O, and recovered by centrifugation as described above. Purified PCR products were quantified by fluorescence using PicoGreen (Molecular Probes, Inc., Eugene, OR) as per the manufacturer's instructions.

Dye terminator cycle sequencing reactions with AmpliTaq® FS DNA polymerase (Perkin Elmer Applied Biosystems, Foster City, CA) were carried out using 7 pmoles of primer (Oligonucleotide BTK-3; 5' tccaagtcctggcatctcac 3', SEQ ID NO:8) and approximately 30-120 ng of 3' template. Unincorporated dye terminators were removed from the completed sequencing reactions using G-50 columns as described above. The reactions were dried under vacuum, resuspended in loading buffer, and electrophoresed through a 6% Long Ranger acrylamide gel (FMC BioProducts, Rockland, ME) on an ABI Prism® 377 with XL upgrade as per the manufacturer's instructions. The sequences of the amplicons, or GTSs, are described in SEQ ID NOS:9-1008.

All publications and patents mentioned in the above specification are herein incorporated by reference. Various modifications and variations of the described method and

system of the invention will be apparent to those skilled in the art without departing from the scope and spirit of the invention. Although the invention has been described in connection with specific preferred embodiments, it should be understood that the invention as claimed should not be unduly limited to such specific embodiments. Indeed, various modifications of the above-described modes for carrying out the invention which are obvious to those skilled in the field of molecular biology or related fields are intended to be within the scope of the following claims.

CLAIMS

WHAT IS CLAIMED IS:

1. A synthetic oligonucleotide comprising a contiguous stretch of at least about 15 nucleotides first disclosed in at least one of SEQ ID NOS:9-1008.

2. An isolated cDNA polynucleotide derived from the genome of a human that is capable of hybridizing to a sequence first disclosed in at least one of SEQ ID NOS:9-1008 under stringent conditions.

3. An isolated polynucleotide comprising a contiguous stretch of at least about 60 nucleotides first disclosed in at least one of SEQ ID NOS:9-1008.

4. An isolated polynucleotide according to Claim 3, wherein said polynucleotide sequence comprises at least one of SEQ ID NOS:9-1008.

5. An *in vitro* process for producing a polynucleotide comprising the steps of:

a) obtaining a polynucleotide template encoding a sequence capable of hybridizing to a GTS of SEQ ID NOS:9-1008;

b) combining said template with a synthetic oligonucleotide sequence of about 14 to about 80 bases in length that comprises a contiguous sequence of at least about 12 nucleotides disclosed in one of SEQ ID NOS:9-1008; and

c) processing the combined oligonucleotide and template preparation such that said oligonucleotide sequence hybridizes to said template in the presence of a DNA polymerase molecule and a sufficient concentration of dNTPs for said oligonucleotide sequence to prime DNA synthesis by said polymerase,

wherein a polynucleotide is produced that encodes at least about 50 contiguous nucleotides first disclosed in one of SEQ ID NOS:9-1008.

6. The process of Claim 5 wherein said template is mammalian cDNA.

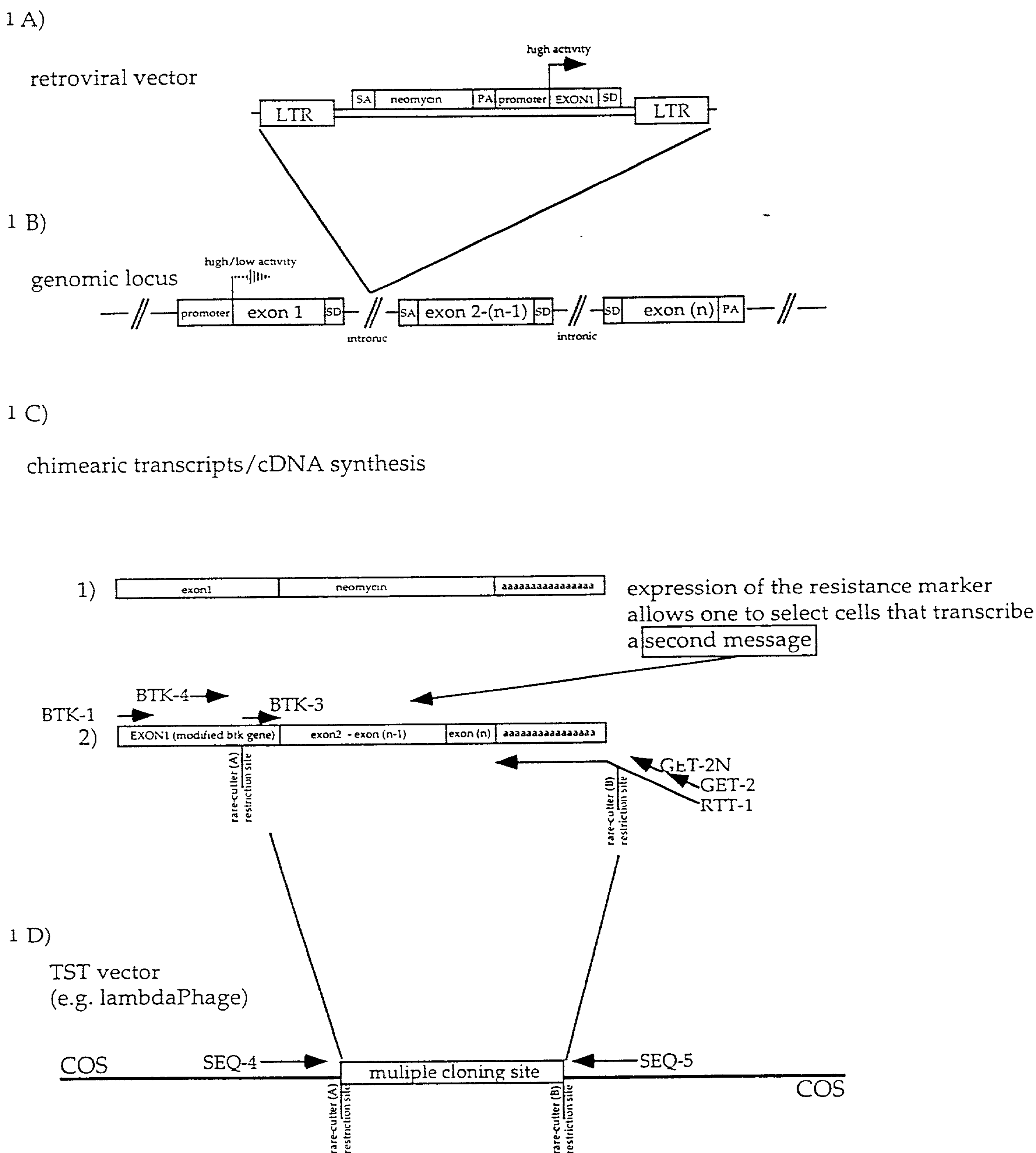
7. The process of Claim 5 wherein said template is mammalian genomic DNA.

8. A process according to Claim 6 wherein said templates are of human origin.

9. A process according to Claim 7 wherein said templates are of human origin.

ABSTRACT

Novel human polynucleotides are disclosed that correspond to human gene trapped sequences, or GTSs. The disclosed GTSs are useful for gene discovery and as markers for, *inter alia*, gene expression analysis, forensic analysis, and determining the genetic basis of human disease.


1 A)
retroviral vector
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1 B)
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EXON1 (modified btk gene)
exon2 - exon (n-1)
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(e.g. lambdaPhage)
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SEQ-4
muliple cloning site
SEQ-5
COS
rare-cutter (A) restriction site
rare-cutter (B) restriction site

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below at 201 et seq. underneath my name.

I believe I am the original, first and sole inventor if only one name is listed at 201 below, or an original, first and joint inventor if plural names are listed at 201 et seq. below, of the subject matter which is claimed and for which a patent is sought on the invention entitled

NOVEL HUMAN POLYNUCLEOTIDES AND POLYPEPTIDES ENCODED THEREBY

and for which a patent application:
☒ is attached hereto and includes amendment(s) filed on *(if applicable)*
☐ was filed in the United States on as Application No. *(for declaration not accompanying application)*
with amendment(s) filed on *(if applicable)*
☐ was filed as PCT international Application No. on and was amended under PCT Article 19 on *(if applicable)*

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

EARLIEST FOREIGN APPLICATION(S), IF ANY, FILED PRIOR TO THE FILING DATE OF THE APPLICATION			
APPLICATION NUMBER	COUNTRY	DATE OF FILING (day, month, year)	PRIORITY CLAIMED
			YES ☐ NO ☐
			YES ☐ NO ☐

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

APPLICATION NUMBER	FILING DATE
60/100,917	September 17, 1998

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION SERIAL NO.	FILING DATE	STATUS		
		PATENTED	PENDING	ABANDONED

POWER OF ATTORNEY: As a named inventor, I hereby appoint S. Leslie Misrock (Reg. No. 18872), Harry C. Jones, III (Reg. No. 20280), Berj A. Terzian (Reg No. 20060), Gerald J. Flintoft (Reg. No. 20823), David Weild, III (Reg. No. 21094), Jonathan A Marshall (Reg No. 24614), Barry D. Rein (Reg No. 22411), Stanton T. Lawrence, III (Reg No. 25736), Charles E. McKenney (Reg. No. 22795), Philip T Shannon (Reg. No. 24278), Francis E Morris (Reg No. 24615), Charles E. Miller (Reg. No. 24576), Gidon D. Stern (Reg. No. 27469), John J. Lauter, Jr. (Reg. No. 27814), Brian M. Poissant (Reg. No. 28462), Brian D. Coggio (Reg. No. 27624), Rory J Radding (Reg. No 28749), Stephen J. Harbulak (Reg. No 29166), Donald J. Goodell (Reg. No 19766), James N. Palik (Reg. No 25510), Thomas E. Friebel (Reg. No. 29258), Laura A. Coruzzi (Reg. No. 30742), Jennifer Gordon (Reg. No. 30753), Jon R. Stark (Reg. No. 30111), Allan A. Fanucci (Reg. No 30256), Geraldine F Baldwin (Reg No 31232), Victor N. Balancia (Reg No. 31231), Samuel B. Abrams (Reg. No 30605), Steven I. Wallach (Reg No. 35402), Marcia H Sundeen (Reg. No 30893), Paul J. Zegger (Reg. No. 33821), Edmond R. Bannon (Reg. No. 32110), Bruce J. Barker (Reg No. 33291), Adriane M. Antler (Reg. No. 32605), Thomas G. Rowan (Reg. No. 34419), James G. Markey (Reg. No 31636), Thomas D. Kohler (Reg. No 32797), Scott D. Stimpson (Reg No 33607), Gary S. Williams (Reg. No 31066), William S. Galliani (Reg. No. 33885), Ann L. Gisolfi (Reg. No. 31956), Todd A. Wagner (Reg. No. 35399), Scott B. Familant (Reg. No. 35504), Warren S Heit (Reg No. 36828), Kelly D. Talcott (Reg. No. 39582), and Mark A Farley (Reg. No 33170) and, all of Pennie & Edmonds LLP, whose addresses are 1155 Avenue of the Americas, New York, New York 10036, 1667 K Street N W , Washington, DC 20006 and 3300 Hillview Avenue, Palo Alto, CA 94304, and each of them, my attorneys, to prosecute this application, and to transact all business in the Patent and Trademark Office connected therewith.

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205	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
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	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	STREET	CITY	STATE OR COUNTRY	ZIP CODE

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF MICHAEL NEHLS (201)	SIGNATURE OF BRIAN ZAMBROWICZ (202)	SIGNATURE OF ARTHUR T SANDS (203)
DATE	DATE	DATE

SEQUENCE LISTING

<110> Nehls, Michael
Zambrowicz, Brian
Sands, Arthur T.

<120> Novel Human Polynucleotides and Polypeptides Encoded Thereby

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agccacaaac aacatcagct gtgcacctgg caaagagcct gtgaatcctt cagaattgct 180
attactaaag gcatccttac agtcaagtct ttgaacaatt tttcagattt atgtcatatg 240
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taagag 306

<210> 49
<211> 265
<212> DNA
<213> Homo sapiens

<400> 49
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agtccctgaa cgcccggctt tggaatctgc agacagctct tctagcaggg cgttggcacc 180
tactgactaa ccgtgcaatc actcagcagc tgtgatggtt ggtgacatgt ctttcacagc 240
ccaagatagc ctccctagac tgagc 265

<210> 50
<211> 243
<212> DNA
<213> Homo sapiens

<400> 50
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cccacatggt tatgcctcca acaaatcagc agcaagcaca cgttgcctaa ccgcccaaac 120
ccctccccac aaaccacctt ggaaaaatcc cggccctcaa attctctggg agactaatct 180
gactgacaat aaaactctgg tctcctgttc agctgccttt gtgcaaatta aagagtttat 240
tgc 243

<210> 51
<211> 181
<212> DNA
<213> Homo sapiens

<400> 51
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cctttgtgca acagctgccg tggcccatct gtgagagaca cgtggacccc gtgcctcgaa 120
acaggtcctg ggagtggtgt aggcaccatg atcccctcag aagattcagg gaaaaaaaaa 180
a 181

<210> 52
<211> 332
<212> DNA
<213> Homo sapiens

<400> 52
gcccctacaa atgcatggac tttgactctn gccagacagg accaagtttg tcaccatctg 60
gcaatcatcg tgaggccgga aggggagact ctcctcagag cacttggtat gatgtccctg 120
tgaagaactt tgtcagctgg gctggcgaag tggtgtgatt tccagtgtag actccacacc 180
tgaggtcctc aagcccagaa ggccctttga ggtctcacta aagagggggct agcagcaaca 240
tgggggagtc cttgggagct ccacgaatca gaatcctggt tctattattt atgaaggata 300
attattaaag taaattcctc tgtctttagg tc 332

<210> 53
<211> 461
<212> DNA
<213> Homo sapiens

<400> 53
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aacaatcttg tctggctctc ctcctgtgga ttatttgatt gaatgacttt caaagcctgt 180
ctttgttttg tgttgctata aaggaatatc taagactggg taataactta caaaggaaaa 240
aagggtttat ttggctcaca atactcatgt ctggaaaagt tgaagactgg gcatctggtg 300
acggcctcag gctgctccca ctcatggtga aaagcaaagt ggagtgtcat gtgcaagaga 360
tcacatggta ggagggggaag caagagaaag attggggacg tgcccaggtc tttttaacaa 420
ccagttctca aaggacccag cttgacgaga actccttacc c 461

<210> 54
<211> 218
<212> DNA
<213> Homo sapiens

<400> 54
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tttcaaaact actcggccat ggtggatgat gcagcagaag gccttgcatc agagggcctt 120
cttgtgaatg cttgtaagcc atcttatacc agatgcaggc ctcttgacct tggactcccc 180
agcctccaaa actaataaat gtcttttctg tataaatt 218

<210> 55
<211> 633
<212> DNA
<213> Homo sapiens

<400> 55
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taactggtgg ctntaagaat gagtnttatt acgccctctg aagtctagag cccactgaac 180
cctgaaggga gtaagacnga cgaatggaac tgaaaggctc atggcntatt cacatacttc 240
cgctgcttnt ctttgtgcaa gtngccgaag acatgccaca gntgctcgnc gnagtaacaa 300
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ccccgggcnc ccaanangcn gggattacag ggggntgccn ccccacncgg gggaaaaatt 600
tggntnttta anaaggggggn ggggttttcc ccc 633

<210> 56
<211> 650
<212> DNA
<213> Homo sapiens

<400> 56
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cacttcacgt ccaggaacct cagcttcaaa gaaaaccaaa cgctcatgct tcatttaatt 180
ccccttattc ggtcttccaa agaggtggag aatagctggt gctcactgtc ccagacactg 240

agatggcatt tcaagatttt ctctgcaatc tggtctctga acagacttga gcctttgtct 300
gctggttccc aaccctggtt acacatcaga accatgtgct ccaggacctc acctcttgga 360
gtctgaggtt gagcccagga aactctatgt ctccatattt ccatccagac accctctctc 420
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tccaagaagt cttncaagat tcaccagatg aaatgtatgg ccatttcttc tacattcccc 540
acagaacccn ggtttgaact ttacaggctt aaacttattt ctatgactcg ctncactatg 600
cattnccgct tctatattcc taacacctgg ccagaaaagg gctaaaaatt 650

<210> 57
<211> 196
<212> DNA
<213> Homo sapiens

<400> 57
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atatgtgagt ctccccacca ctagaactct taagtggctg ctgttatgga aggtcaggct 120
cataatcacc gcatattaag tccttaacag caatgtctgg ctcttcatta atctgtaaac 180
ttactgattt accgag 196

<210> 58
<211> 415
<212> DNA
<213> Homo sapiens

<400> 58
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tccagtgtcc cacttgcggc agccctgtgg ctttgcctgc acagctgaga cctcgaaacc 120
cagctatgtg gctccacacc agacctacct ttcttccctc tgtggcctgg actttccaga 180
gaacacaagc aacaagaaga tcacaaccct aaggagggtt gcaactgaga aggtggccct 240
tcctgcagct gccaggctgt tatctgcaca gagcattgca gcgtgagcca cctcagagat 300
ggcagggcca gagcctaaaa aagcagcatt ggcacagccg cagggatgga tttgaggagc 360
cctggaatac tcccccaaaa atgccgcagt tagaatacac agcgtatcca ccagt 415

<210> 59
<211> 177
<212> DNA
<213> Homo sapiens

<400> 59
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tactgttctc tctcgagcac ttgcaacaac tgtttggaat ggcaacatag atgcattgag 120
taataaagtc acaacttgct gccaatcatt ttgggctaaa taaagctaac attccag 177

<210> 60
<211> 372
<212> DNA
<213> Homo sapiens

<400> 60
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cttctccctg cagtcatcct gcccatggct gttgatggcc ctgatggggc ttggagcccc 120
canaatgtgc agaanttgga caaaggtggt cttcaaatgc aatggttgtn ttatnaccga 180
aagcccacgg natccagagg aggccctttn ctncgaagtt tacagagagc acaggtctct 240
gtacgtccca agtttcccct gctgccaaat gcaggggagg agagaattct ggaagcccac 300
cctgtcccat ggctcccctg gcacatggag ccactgaatg tcttgtgaac attaaacaaa 360
tgcttccaag tg 372

<210> 61
<211> 120
<212> DNA
<213> Homo sapiens

<400> 61
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ttcatctgtg ccgagaccta cacaaacagt gatgaagcat cgcagccgga ggtgggagag 120

<210> 62
<211> 299
<212> DNA
<213> Homo sapiens

<400> 62
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gntttttttt gcatgatcaa gcctttcctg atgcccttgg tgagagggga gctcccctcc 120
cctcagctct ggccacagtg tatccggatg gccactgtcc cactgcagca cgtgggcttg 180
ttagctgtga tggctcctgg agggctgagg ccacgttcaa tgctgtgtct aattcagctt 240
tgtatcccca acatctcacg cagtacataa aacagaataa acacttttgt ttataaatg 299

<210> 63
<211> 358
<212> DNA
<213> Homo sapiens

<400> 63
caaancngna atngaaaagg nnnngtccng ccnttgggga natcttntaa aattcagtga 60
annaaangac gaanctacca ttaattttac catccagact gcaccaaaat gttaacaata 120
ctgtnttctc tcctattaat aaacctgtac ttatatttta taaaattggg agcatatttc 180
atacttttat aacttgtgtt tttcatgtat atcatgaaca ttttccaaga ttgttaaata 240
ctctgaaaac atgattttta atagtaatat taaatatttg nnatattcct tttgatagtc 300
cactatttat cctacatgat ctataacata agtataaata aaaacatttt accttcat 358

<210> 64
<211> 195
<212> DNA
<213> Homo sapiens

<400> 64
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agaatgttaa aagcccaaga agaagagtag ctccaaagat ccaggaagca gagcaccatc 120
accaggataa atgaatttca actatattga atcactgcat tgttccattc aagatataaa 180
ttccagagag aaagc 195

<210> 65
<211> 323
<212> DNA
<213> Homo sapiens

<400> 65
aaattccagg gactaatatt gagatgaacc aggcatgaga ccaagctgca aaattccaga 60
aatgacctcc aggttgttag tctacaaccc agccatcgtc aagataacat tagactgcgt 120
tccaggtgga ccatgactca agatagccac cagaccaagg cacggacacc tagcacccag 180
caccactcct gcatgccccc cactctaagt tcccctttat aaacacctct ccacagtcga 240
aagtttgaaa tcgtctttta agggcatgag cttggccatt cccagatctt ggcatttgaa 300
taaagtagct ctctgttcat cac 323

<210> 66
<211> 175
<212> DNA
<213> Homo sapiens

<400> 66
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agtggagaaa ggaacactct ctcagtatgt caggcatttg gtacagaatc agagtcccaa 120
atgggcacat ttgcttggcc aagcttaagt cacaggcttt tctaactgcc aaagg 175

<210> 67
<211> 243
<212> DNA
<213> Homo sapiens

<400> 67
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gactgggatg tatatcacag atctgcttca tcgcagcaca gtctggaagg aagcctggga 120
ttccagggct gggagagacc tcgagagaca gtcaagctca tcacttcaac tgcaggcaga 180
gaaatgcaaa tataagagct gattcctaag gtttcttcaa tgaataaaat tatacaaatg 240
tct 243

<210> 68
<211> 179
<212> DNA
<213> Homo sapiens

<400> 68

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gcctacgcta agaagccaac acagagacac gcaatgcaca ctatcagcag gagtggcttg 120
gaaattctga cttgtattga ttgagacacc ttcccacgaa gaaagatggg attagtaat 179

<210> 69
<211> 160
<212> DNA
<213> Homo sapiens

<400> 69
ggcagcaaac aagagctctg aaaggggaag gaagccagga gaaagccagc tccattagtc 60
acgcagcagc atatcctgtc acaaaggacc ccagttgagt aatcgcccaa aatatgcctg 120
ttattttttt ctgtcagaaa aaaaangggg cctgccaaaa 160

<210> 70
<211> 585
<212> DNA
<213> Homo sapiens

<400> 70
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agccccagag tgtgagtata agctgtgttt atcttgcagg ttcaagcaaa tcctactgtg 120
gtggggcaga ggaccttgag aaattgaagt tcttggaaaa taactcatct tcaacctaag 180
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ccacatcagc aggaaatgtg ctgaccttac tttttctaag catttgcaga aaactggtga 300
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aaatttttgc agncaaaccc aaaagcctgg naaggcctaa aaaatttagc gnggngcccn 480
cccnnnganc ggcaacntna aanaanggcc ttngttcctt nccccccccc ngnnccgttt 540
aaaaaaaacc cgngggggttt tnaanngttt nnttgccccc caaaa 585

<210> 71
<211> 630
<212> DNA
<213> Homo sapiens

<400> 71
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caatctgaac ttaagaccaa ggacacacaa catgagcact tactttgaca gttctgacat 120
ttcttcatca taaattctct tcctatcaga caattcatcc ggcaaatatc gaaatattaa 180
ttcttcggcc agaacagtta tgttaaagtt tctgcttgcc aataactgta acaaaaaaaa 240
gtcaaatgat actgtatggt aattgattct aaaggacgaa gcttccgagt ggaaaggtga 300
acaaggaggt ggtgggtggg atctctgagc aggtaagaag gaaaagggat ggagagagag 360
gcgggccagc ctgtaacaag agcaggggca gcccctccac tgtgagaaaa ggccaggagg 420
aggcgttcac ctggatgaag gatgaggcaa ctcaatcttg acagcatcta cattttcaac 480
caagtgccat gatgttggtg agaggggagg aagtgaagta gggcatgttg ggagaggaga 540
gacttttgca atgatcagct tggaaagtga agactggact actaaaagaa agaatgtaag 600

aatgattact tatgttttga gtctaaactt 630

<210> 72
<211> 424
<212> DNA
<213> Homo sapiens

<400> 72
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cctcaagcct ggatacctgc tgtcttaaac gaaaacgaaa acaggcattt ctgtgttcat 120
gctccaaaag ttatcttttg gcctgccaca ccccctatnc tgccccatat gaatcccgaa 180
ccccatactt caaaagccga ccaacnagcc cccanaccaa canaaggntn gcngaaccat 240
ntngcaaana aaggganaag aggaggaaca tttgaatncc naaatgagtt canctngggg 300
cngtcagana ggagtccanc cnctgggcng ccngaattca agggaggatc ancttttcct 360
ttattccctt tcttttgctt cccantcatt ctngttgaag gcccttcncc ncttcattaa 420
aact 424

<210> 73
<211> 410
<212> DNA
<213> Homo sapiens

<400> 73
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agttgcatgt gctacgatcg cctgtttgac ttgcaaagca catggctctc actaacatca 120
gtagaatctg aatccatgga acagatcttt gtcaattact attgttatta gttttccttt 180
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aatcttgatg agaggcaaaa cttgcttccc actgtagaag tggaaggctc atttccccagt 300
ctcccttgca gttggggttc agaatatgac tgagctcttc ctggcagatg caccccttcta 360
gtagtgcaaa gaagctgtga ggaggaggaa cattgctgga ggttggcggc 410

<210> 74
<211> 337
<212> DNA
<213> Homo sapiens

<400> 74
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acggtggcaa gtgctgctgc atttcatggc ctcagatcaa aatacaacct cattagctgc 180
tgtgaacaca atgttcctgt tgaagaatag aatggaatgg agttaagagt gtagaaggtc 240
tgatgcaaat ttactcctac tcctattgac aaagagtttg aactactgaa tttgtatatg 300
aaagtcaggg catcctattg ttttcagttg tcataag 337

<210> 75
<211> 150
<212> DNA

<213> Homo sapiens

<400> 75
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aaggaaaaaa ggggaggaat gaaagagaca gagccggcca ctacctcatc tagcaaatag 120
aagcctacag acacttanng anggncaccc 150

<210> 76
<211> 320
<212> DNA
<213> Homo sapiens

<400> 76
gaaatcgaat gcctgtcttg aattcatgtg aagcacagag gtgccagatc tacagtataa 60
tgaagaacta aggctgcaaa tgcgggaatt gaaagaacca tctttaagga aaggatcacc 120
actccaagat ttaacaaaaa tataaaaaca ccttccgtgt tgcttagtct caaagaaagc 180
ctgcaaatat ggatactgaa taagctttct caaggattct tctaaatcca gtcccatctc 240
tgtgggacgc tcatccctgt tggccatttc catctgaatc actcctcctc ctgagtttaa 300
taaagcacac gccgggcccg 320

<210> 77
<211> 338
<212> DNA
<213> Homo sapiens

<400> 77
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taacacagcc tcagactgtg gatgaagcag atgacctgct cagctttcct tccaacattg 120
ctgtttgagc gcatacagcc ctttccttgt tttgaagacg ctagccagct cagccagaga 180
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ttgagcagaa tgtagttggc ttgcttcacc accattcttt cctacctcca aaggctgcca 300
ggcctgctaa atagtgatta aacaaagatt aaaattcc 338

<210> 78
<211> 396
<212> DNA
<213> Homo sapiens

<400> 78
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ttcataagat gaggaaactg agacactgga agaggaagta acttgcccaa tgtcactcag 180
ccaggaagag gtggaaccca gcattgaaat ccagacagtc taactccaaa acaaataaac 240
aataccacca cacttttatc ttctaggcta tacatttcta atggccaatg aagaaaacna 300
actgaaaaca aaattccttc tttctgntct tgnttattnc taaagggtgg ncttttagct 360
catggtngaa aattaaagta gtaacatggt ttcagt 396

<210> 79
<211> 83
<212> DNA
<213> Homo sapiens

<400> 79
atcttcactg aggtggagga gcagtgcagt ggccaagaga aagatgggat tgacagaggg 60
aaataaaaag aactctgata tgt 83

<210> 80
<211> 314
<212> DNA
<213> Homo sapiens

<400> 80
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ctgaaaatac agaagcagat ttgtggtttg gaagggagct agncctcatg aaaaacagca 120
acctggcaaa cactattttg gaataccgtc attttcaaaa tatacatata ttttttaagc 180
ataaaactgc atttgaagtg gaaattaacg tatttgtttt tagcacctca gctaagtatt 240
taggatgcaa aaaaaaaatn taaatttttn tggaaaaaga atcattcaaa taaaaaccat 300
taaaggggaa aact 314

<210> 81
<211> 382
<212> DNA
<213> Homo sapiens

<400> 81
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caagccaaaa aacctgaaac cacaggccaa agtgagagct tatatacctg ttttcccact 120
tgaatgctgc tttttcctca accacccctg gccccgccct gcgccatcct gtgcctatta 180
aaaccccaga ctcagctagt acatgggact atggctggac gtggganaaa agcagcttga 240
cttcagaagg acagcttaac agcgtaactt cggagaagaa tctggctgga gatgacctga 300
cttnagggga aggnaatctt cctacccccct tcgatttaca aggtcccttt ccactgngag 360
gcccttttat tttgccataa aa 382

<210> 82
<211> 347
<212> DNA
<213> Homo sapiens

<400> 82
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atcaagacca aaaaagtgac tgaaacccaa ttacttgggg aacagatgaa gaggatccca 120
agcaatggtt gagtctcctc catggctcca gaactcacag gatagcccct ttctcgctgg 180
tccatggctc ctgctctgat tttagtatct ggttcctggg atcaaataac atcatctcct 240
ccctccatcc ctccaggact aagggtagca atgatttatt cttctttgca gtctctgagt 300

cacatcagnt cccttgcttg ctttctcaac ttttctatta tctatgg 347

<210> 83
<211> 260
<212> DNA
<213> Homo sapiens

<400> 83
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tttcaagact gtaagtgcct tttcccagga tgccagcaag tactgagcct gtattttgag 120
ctgcatcaaa ccctgttgga ataaaaaagg acatttctag gagatcagtc ttcaagattg 180
gccccagttt ccccagagta ggaagaggca ggaagccaga gcacatgttc tctccagaaa 240
taaagttgtt gcagtggcct 260

<210> 84
<211> 169
<212> DNA
<213> Homo sapiens

<400> 84
atnctgcaag gngtgngtgn ncttcccanc catggattac aggnaaaaac ttgactgcat 60
gtgatccttt gtagttaata acatgatgat tgtgttttca cactctcgtg tgagatatgc 120
ctccctcaaa tcttggcaca ttacccatct gacattaaaa aaaaacaac 169

<210> 85
<211> 238
<212> DNA
<213> Homo sapiens

<400> 85
cgctgcataa ttgtaccatg agccacgatc ctaagtcaag agacctttct ctcaccagtg 60
cagatgattg ctccctccag gtgtgtagga gggaggatgg catggctttc atcaaaccgt 120
gagctttttc agaacttcca acccaccata aagctcatct gaagaatgtt tgcttttccc 180
tgtcaaatat ttctctgatc caaagtctgt taacaattta aacgtcaaat ccccctct 238

<210> 86
<211> 634
<212> DNA
<213> Homo sapiens

<400> 86
agtgacatgc ttgaggaaga gtgatgaata atactgagga tgattcaacg tctcttggtt 60
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gtgtcataac atgtattatt acagtgcggt gtaaccacat gtcagaagag aatgtgtagc 180
tcaaaacacc gaactaggtg gagaggccga ggccttaatt ctccaagaga ctgggacctg 240
tgctgggttc tagcgcctgt tcagcgtcag aatcatcagc tggctgtgag cctacgtgaa 300
tttttctcca ctcaatctca tcatccttca gacaggcgga gagagcggga tccatctatg 360

agatttctct gctgagaaat ctcctccctc cctccaatga agcaacagca ggtcatatct 420
gaatgcagaa gcatggcctt gtgctgggaa aacacatcct ggctgtagag ctctcaggct 480
tctagagtca aagccaaggg ttcaaatcct ctctgnctta ctcagaagcc acatggtcct 540
gagacagtga aagtaactct gtgaacctca gtttaccaat ctgtaagatg gggatcataa 600
tgtaaaaaga tggcattaaa acttacattg ggaa 634

<210> 87
<211> 180
<212> DNA
<213> Homo sapiens

<400> 87
caggccttgc ctcatcaagg tcagagcagg gcttcagggg gnttaccntg gatangactt 60
cttnnantng tgngggnncnt gnctaccttt tgagcaagtt cagcctggtt aagtccaagc 120
tgaattggcc aattcttttg cnntttaccc tggaagaaat actcataagc cacctctgtt 180

<210> 88
<211> 386
<212> DNA
<213> Homo sapiens

<400> 88
gcagtcttag tggtgctaac aatcaagtgg cttgccttgt tctgacctga gtgttcgcca 60
aacactcccc aggctacaac agncgcgctc ccctctgaaa tcaggacaca agaattgaaa 120
gaaactggaa cagatacatc acttacccct ggcatccaga accccagagc atccttccca 180
caaattggtt ataacaaatt accacaaact cagtggctta aaagagcacc aattaggggt 240
ctagcatcca aaatatataa agagctcttt tttcatacat atccatacta tataaagatc 300
tctcacaaca acaaaaagat aaccagccca attttttaaa aaaggtcaaa aaatggaaat 360
ttcctcaata aagatatata gtcaac 386

<210> 89
<211> 595
<212> DNA
<213> Homo sapiens

<400> 89
ggaaacagaa gactttaaaa aaagaaagga agaaagaaaa agaaaccacc aactctgcaa 60
agttctctgg aatctgagaa gtcaagcagg gcttctgcct tgttcatggt gagcctaaac 120
tgtgatttcg tctctagaca tgacacatca ggcatgcctg gatctggttt ttctgccaag 180
ccttctgaca gtaacgcagg catttgctag tgtatatgga ggaaggctga cttgaagtcc 240
ccagtacatt tcacccagtg agaagaggac aacactgact ccagaaagcc ttttgctgac 300
ctgctctttg aaaccagtgt gcctgccagg aatcctcgcc ctgtgccccg cctacactca 360
tccccaccta ccttgtccac tctgccgcca cagcttcagt caggtcctca tccctttctt 420
cacttcatta ccactaaaga aagcctcctc ctgggtcccc atgctccagt ctggctccct 480
tccgatgcat ctcccctgca gctgtcagtc attgntctaa aatgcaaatc tgaccatgcc 540
actctgctta aaactcttca atgactatgc taacattaaa gatgaagcag attcc 595

<210> 90
<211> 159
<212> DNA
<213> Homo sapiens

<400> 90
gctgtgaaga gctcctgggt tgctgaacaa atggagttgc tgcaaggatg ccatgcctgg 60
agagggcctg gaagccctgt gccacacccc catgccttgc cctatgtaca ttttcatctg 120
catcattggc aacatccttt ataataaacc agtaaaagt 159

<210> 91
<211> 555
<212> DNA
<213> Homo sapiens

<400> 91
gtgctcaatt ttctactaag gttatgtagt atctttataa acagaaaaag aagtattttt 60
aacctttagg aaattctttt ggcttctgga tttttccag tattttgaag tgtttcctca 120
gaaaagattc gcagaagtaa tattagttca agagctcata agacattgag agaatgaaat 180
aacacccatg taaaagaacc taatctagtg cctgggacat ggcagatgct caaatgttgg 240
atcttaaatg gatgaactgt caagtcatca aaacagggat tcgcttaaag aacatagtgt 300
tctgccttct agctaagaag cattcgatcc acttaactga attgtgaaac tgcaagataa 360
aggataaaga gcgctgaact gggcctccat aaaagtgaac cacagatttg ctcatgagct 420
gtgtgacttt ggaccaatca cattctctgg gcctgtggcc cacaacggat gagtcatgaa 480
catttatctg tatgtctgtc atctccatta gaatatgttc atataggatt atatgtccgt 540
gaagacggga cctgt 555

<210> 92
<211> 322
<212> DNA
<213> Homo sapiens

<400> 92
tttcaggggt aatcttgtga caaaccaggc atggagagct agctgtgaaa ttccagagat 60
gatctcaagg taattagtct acagcccagc cactgctgag atgacaccag cacacgctcc 120
aggtggacca tgactcaaga cggccaccag aacaaggcat accgacctta cactcagcac 180
catgcccgca tgcctccctc tccaagttcc tcttttaagc cctctcccc agcctaaagt 240
ttgaaatgtt tcttgtaagg aatgagcctg gccatttccc caaccgctgg cttttggaat 300
aaagtcactt tccttttact gc 322

<210> 93
<211> 634
<212> DNA
<213> Homo sapiens

<400> 93
aaacttggag gctcagaccc tggtttaatg tgtccttctc ttactcctga gttgcaagca 60

gtaataaaag agggtggttc gtgtacagta ctcgatcagc ctattccact agatagattg 120
gtagtcaaaa gtattgaacc actccatgtg tcagtctttg ggctgagaaa tgcttttctt 180
atacaacacg aaaacagata tcgacagtgt atagcagcat tcttattaca agcccaaacg 240
gaaaacatca aaaaaacatg gatggcacaa ataacaactg caatttcttg ctttaccaag 300
agtcaggaaa ccaagaaaat atctttattc acattgcccg cagaatcctc tgaaatttag 360
ggacctaaaa caagtggcat gtctttttag aagattatgg tttaaggtat aatttcattc 420
aaagttttgt aacacttagc tagtgataag ctaggaggaa atttgcattt taaagaagtt 480
tcagaatttg aaattttgag ctaggaaaat cctcagtatg gaggaataat gactgcaaca 540
aatttgaact ctgaggaatt tcttgacaaa tatatactgg catccagatt accttctaat 600
gctttccgtc angtttggna agaggtgtga gtga 634

<210> 94
<211> 345
<212> DNA
<213> Homo sapiens

<400> 94
gacaagctgt gaaatgccta gattccagag caacagactg tgatccattc ccaacaaccc 60
ctccctaccg tctgccacca gttcccttaa agcaggaatc agagctagac tgactcaact 120
aagaattgtt ttggagaact tggaactcaa cattccanaa agcaagaagc ttgacatagc 180
atcgatgagc ccaagtcaac tatatgaaca aaacaatgtc tcaggagggg cagggtatca 240
cgtcagaaga atcctgagtc cttagatgac cttgtagaaa agagccacaa acttactctg 300
ggctaccttc atacctctga actattatgc agagagaaat aaatg 345

<210> 95
<211> 256
<212> DNA
<213> Homo sapiens

<400> 95
ttcatctggc tctccatgaa tgtcctgctt ttctggaaaa ccttcttgct gtataaccaa 60
gggccagagt atcactacct ccaccagatg ttgggggaac tgtcttgaaa cctatacatt 120
tcagatgggc acccagagag taagacctca cctcgcccct caagttgctt acaatataat 180
ggaaaaacca acaaataaat aattataatt caataaacaa gaaaaggttt cttctaataa 240
acacatgagg tctgat 256

<210> 96
<211> 241
<212> DNA
<213> Homo sapiens

<400> 96
agacactgct agcagtcacc tagaggacgc tgcatcccag tcctggccat ctcctctggg 60
tcgctggcct gtgcgcccaa ccacagaagg ccgagggctg ctgcttcctg gggaaggatt 120
ctgggaatga tgagtacctc ttgcttcatg acaataagac aaagaagaat tttgggaaac 180
tgtgtctggg gaaacaaaga aaaaataaaa ttatccttta gtanaaacag aaaaaaaagg 240
c 241

<210> 97
<211> 262
<212> DNA
<213> Homo sapiens

<400> 97
gngtttngcn aantccagcc tgggaaagct ggcagaggat gcaccgtgtt ttactcacct 60
gagtgnttac aatgctcgtg aggtgcctcc ctgatagtac agaggaatga agaaggaata 120
aacagacctt ctggataatt gcatcagcct tccccactat tccaatgcca tgctaacatt 180
tcaagtagtg tcccttttgt cttgccgaga aaaaatcatt tcatgattta ttacactgga 240
ttaaaggcta tgcacactct gg 262

<210> 98
<211> 155
<212> DNA
<213> Homo sapiens

<400> 98
gtgctatcca acatggacgt ctaatcttta tgtaatttct tggagaagaa acacctatca 60
gttggagagt gtgtaaccac tgcagaggaa ctcctacgct ggaatacaag cataggccaa 120
aacctttctt gctcagtaaa actcaatgta gttag 155

<210> 99
<211> 242
<212> DNA
<213> Homo sapiens

<400> 99
gccagctacc tgaggaagtc caactaccct gaaaccacca tgctatgagg gcgcccaaac 60
ctgccaggta gaaaggccac gtggagaagc actgaggtac cagacatgtg agaaaagatg 120
tcttggacct tccagcccag ccccggcacc aactgaacac agggaccagc caacacccca 180
tggaacagaa ttgaactagt caactcatgg aatcttaaga aacaataaat tgttgttatt 240
tt 242

<210> 100
<211> 54
<212> DNA
<213> Homo sapiens

<400> 100
gaatggaaac tgaaagtgga aatcaggaaa aggtaatgga agaagaaagc actg 54

<210> 101
<211> 270
<212> DNA
<213> Homo sapiens

<400> 101
gtgaaaactg aggnanagag atggacgtgc aggatagaag gngatnnatc naaggacaca 60
ctgctggctn taggccgagt tgcagntaaa atgaaganct ccngattcct ggcctcatcc 120
ctttctcctt ttgnatgtga tttacataca aatntatata gaaaaccaag anaagtttta 180
ttttaaaagn actatcctta ctatgtgtga caaactaaca ttttctattg ttcttttatg 240
aattactagt cacaactcat taaatccatt 270

<210> 102
<211> 287
<212> DNA
<213> Homo sapiens

<400> 102
gcanancaca gnatggtgac actgncctgc ttcatgaaca cagnaaatgt tgctgagaga 60
tcatggcatt ttctctcctg ctgagactaa gctgggcttc taaaccttaa gagaacactc 120
caggaaactt catctaattg ggtttactgt cttggaatca gatgattatt aaaatgcttc 180
caattgtatg tagtatatat gatgtagtat actacatggt tgtgcattat agttaattac 240
atacacacat attttggctg tcaaaagatt ataaattcct atagact 287

<210> 103
<211> 535
<212> DNA
<213> Homo sapiens

<400> 103
tttttcataa aggaaagcag catgctgtat agatgagaga agacatccaa aggaagaaga 60
tgcaagccga aaaaaattca agcctcccat ggcgctttca gaacataccg cagatctcat 120
gtggcacagc ccccagcctg ctttaaaaga gcccatagaa gagaaatcag ttgctgcttg 180
ttgtgtctgg gagaataact aatctcagga ctcttgttca ggtgtcctct tgatggtggc 240
ggcccacact cctgaccaga gccaatgaag aagagggcag agcagagggg agaggggctc 300
aggagtaagg ctgcaggaag caaaggaagt gtcaactcaa gagccacaaa caacatcagc 360
tgtgcacctg gcaaagagcc tgtgaatcct tcagaattgc tattactaaa ggcatcctta 420
cagtcaagtc tttgaacaat ttttcagatt tatgtcatat gaaaccatgg gacagacata 480
aaccaaattg taaaaaataa gtaaataaaa caacaaaggc tttaagagat tttgc 535

<210> 104
<211> 381
<212> DNA
<213> Homo sapiens

<400> 104
ttcctaggcc cagatgtcca ccctccttca cgagctnaga attgagctcg tatcgccaac 60
atgttttgcg gaaatgctca tatcaacact tggtgaacca ggaagactgt accctcattc 120
ctttntcctg ctgcctgcta ggttgngtta gaaagcttac tctcgagttt tactggcttg 180
cttgtgcttt ttggcatttt caaaattttg tacaatgatc ttcaaaaagc aaaaatacat 240
taattttttt aaaggtagga tccatatgan atnggatctt catcttctaa cactttggag 300
aacagaaaag tggtatttgg agatataatc ttcataagaa ttgnggcncc taataaaaga 360

gccctggaag aggaaagaaa c 381

<210> 105
<211> 177
<212> DNA
<213> Homo sapiens

<400> 105
cagaaactga ggtacacaga agaaaggcca tgtgaggaca cagcgagaag caagtatctg 60
caagtcaana anaaagggct taaaanaacc ccacccttgc cgcaactttg ntctttgctt 120
tctgggcctt ccagaaactg gtggaaaaga agtaaaaatt ctggttggtt taagccc 177

<210> 106
<211> 245
<212> DNA
<213> Homo sapiens

<400> 106
ggggagctcc tgcattaagn caaaactnac aaaggttggg gnnaaacnct ccactcctgc 60
tttcatacca tttgaagttc agaccagtga gatttccatc agttgggagt ngaagatgcc 120
acaaggacaa gaactgagga tggtttgctc agagctgatt tttagacacc attttccagg 180
gatccctggn gacagaggag catttttntt gtggttgagt tctgaattaa aaagtgtcgt 240
actat 245

<210> 107
<211> 195
<212> DNA
<213> Homo sapiens

<400> 107
gaatttgccg caccccaggg attggaccca ggtcacaacc aaggaagctg cacaagatct 60
gaagtgttag ccatctcctc tcaaccaaat gcatgtgctg agtcctcata tgctggggtt 120
cttgcaaata acttccatgt agaataaaat gcttattaaa gggtcagtaa taaaatgtgc 180
tgttttgaag cgtac 195

<210> 108
<211> 160
<212> DNA
<213> Homo sapiens

<400> 108
gaaagaaaaa taaacatagt catcagcact atgaaggatt ccaggaagtt tgacatcaga 60
gaatttctca actctaaaat gctggaaacc cctgccctca cgctggaggc cgttttgatg 120
tccccttgtt acttttgagt aaatggaaac atcttttcac 160

<210> 109
<211> 155

<212> DNA
<213> Homo sapiens

<400> 109
gaagctcttg tttgaccttc tgaaaaaaat cttgaagtat ctatgagaac agctattata 60
tgaagcagag attataatag atatggagtt taagttgcag aagaagaaga ctgaattatt 120
aaatgggaca tcagaaaata aaagtctttc ctttt 155

<210> 110
<211> 346
<212> DNA
<213> Homo sapiens

<400> 110
atttcagagg aagttgtcta agatggtgcc aggtcaccag aggtgccaat gcaggacaca 60
ggcaatgccg tcaaggttgt atccggtgag gatgaccaca agcaagccag gctcatagcc 120
taaaggatac acctgaacgt gttcgctgtg aggaatgggc cagaggatta tgtgatgttt 180
catatttttt ccttgggact ttcagatttt tccaagtttt ctgccctgag atgcattact 240
gaacttctgt ttttcctctt actacactgt gaagtaaatg tgtgtgatga gtcactggcc 300
tttgccaggc tgtgatcttc ccaagaatga agtccctatt taattc 346

<210> 111
<211> 275
<212> DNA
<213> Homo sapiens

<400> 111
gtgatgtgac ccagcctgtg gcttccactg ccatccacac acgtcgctgc ctctctccac 60
atcagcatcg caactatctc ctggaagctt tccaagtgct gaactacagt aacctcagcc 120
gaactgctgt tcattcaccc cacaggcttg cccctcctct gcatctttgt gagaacctga 180
gagtcatcct aaactcctcc ttccacctca ctcccccacat caaatcgatt accaacttgt 240
gctgatttta tcttcaaata ctctccagaa ttgtc 275

<210> 112
<211> 205
<212> DNA
<213> Homo sapiens

<400> 112
gaggagaaaa gagaaaggaa ccctcccatt catccttccg tatcactact cagaaccaag 60
tacctctgct tctaaactac atcagggagt gcaactccca tggaatcaca ggacaagaag 120
aaatgggaac agatatttaa gttaaatgat ggcaaagaaa tttggaaaag gtaaaaagtc 180
agagaaagag aaaacaatgg tggac 205

<210> 113
<211> 487
<212> DNA

<213> Homo sapiens

<400> 113
gcaggtcagc tgggaaaagg cgaagggatc ctgagacaat ggtggattgc tccgaacagg 60
agcagcctgt tcgggccgag ctccggttcc ctccgagagc ggtttgcaaa tttctcctaa 120
tgtgggagac tggtgcacca ggccaagtgg cccccactgc cccttctcaa ggcactgtga 180
aaccaaatgg aatttgccac gaaagtggct cccggggggcc ttgagaaggg atcagctgag 240
gaagctgcaa agctggtaac aggagggcac aggccgtggg tggcgaacaa gcaactgctt 300
gtctctgcag agtgatgccg gctcaaaatc gaaccactgg ggcttcaaaa ataaaccaac 360
gctgcctgaa aacacaactt gcagaaaaag aattgttctt gaaatttcta ttgtgaactt 420
ttagggnacc aaacttttga aaaatccaag tttttntgca ntttggccaa ncaagggggc 480
atgaccg 487

<210> 114
<211> 251
<212> DNA
<213> Homo sapiens

<400> 114
actgagggat gtcaagcagg tcccccagaag aaaagagatg gcatgcaatg taaagaagac 60
ggctggagct gaatcagcca tctttgacta tggtgttgct ctgagaatgg gatttgcaca 120
aggctaagta acatcataga agtagcccag gtgcctgagg acttcaaaca cccaagcctc 180
cactacagcc tcaatttcct tccttacatt gtttatgtga gaaagcaata aacttctatt 240
ttggttaatg c 251

<210> 115
<211> 139
<212> DNA
<213> Homo sapiens

<400> 115
gngaggncac agcaatcctc cngaggatgc agnngcaaga caccatcttg gaagcagagc 60
agccctgacc agacaccaga tnggncagnc cattgatctt agacttncca gccttnagaa 120
ctatgaaaaa taaattgtt 139

<210> 116
<211> 489
<212> DNA
<213> Homo sapiens

<400> 116
tagacgactg gtctttgctg gcccaaactc tcaaccttgc caagacaaca atggcagatg 60
tttccatatt ggagaggcag ctggggaagg ggatggaagg caagaagaaa tgatagataa 120
attggtctat agtcaagtaa attgccactg tagagacaag agatacaact tgtaacacag 180
ctggcctgga ctgacagaag attcagtaac aatataaaat agcaggaatg atggagctgt 240
aactttgtgt gattcctcaa catctacctg gaataatcaa ccatcttcag gattgcaagc 300
cccaccactc ctgtgttgct ttataatcaa aatgacacac ttgggcagtt tctccaactg 360

cctgataaat tcagttttca aatactaagg tactatatgg catggtgact ttaccattac 420
tccagggtgg gaagtgactt tccactgttt gcggattacc aaagggaata aagcatattt 480
gacagtccc 489

<210> 117
<211> 614
<212> DNA
<213> Homo sapiens

<400> 117
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tggcatcagg aaacccaggc tcttcgaaat atgcagtgaa aaatgaaacc cttgcaagat 120
gagacatttg ataaagaaga aaacatcaaa ttttcttgaa gctttcctct cactgtaact 180
ctgcctcctt ggattgaagc tacagagaag aatgcagcct gcgggtgctc atgcctgagc 240
atcatctcct cttttccacc tgctgagcta tgtctaaata gacatcctct acctttggcc 300
caaaactttc tgttcctgaa tagaaagaac attcttgtca tatcaagagt tctgggatat 360
tctgggagca gtttagagct ttcaatcagt ataaagtttc ttttctcatg aaaagatctt 420
gccacagggg atgagaaaca agctattgag catctaatat atgtgtatac catgctaatc 480
aattgtcata cttcaagtct atttaattaa cagaaacacc ctccaaggaa gtcttatccc 540
ccctcaatta agtagattaa aaataaaccg tcttgggaga agataaggtg actgagctta 600
taagaagagc ccat 614

<210> 118
<211> 134
<212> DNA
<213> Homo sapiens

<400> 118
gtagagaaat ggagccacag atcaaggtca cccagtgagt gagaagcaaa gtctggagct 60
gaggcaagtt tttcaaattc ctcatccaag gctttctctt ggaaagccca aagcttatta 120
aatccttaaa gggc 134

<210> 119
<211> 181
<212> DNA
<213> Homo sapiens

<400> 119
caaaatgaca tgaatgactg aaaaagcatg tggagcacaa gactcaagaa ctaagtgaaa 60
ggactcacac ttcctgattt caagtaaagc tacagcaatc gagacgtggc attgatgtaa 120
gaatagacac atcaatgaat gaaacagaat acatcttcca gaaataaatt cacacaaata 180
t 181

<210> 120
<211> 182
<212> DNA
<213> Homo sapiens

<400> 120
gcttttccaa aatgtgaggc atatggaaaa ttcaggcaac accctgttac ttactcatca 60
cttaagccat gttttggctc agaagatacc aagcaaagct gaatattact gtatttcaga 120
aaggggagta tttcttcagt gctcatcttg gggtcttca taaaaaatga ttgacagctg 180
ac 182

<210> 121
<211> 424
<212> DNA
<213> Homo sapiens

<400> 121
gtgtaatttc tcagaataat tttactctct gatgaaagga gggaataagg taacgagatg 60
ttccctccct cccttctcac attggacctt gtgtgaggac gggacactgg agctgctgtg 120
gccacctgga ccaagagaat caaggaggag ctgacccaaa ccctgatgct gcaaagccat 180
tggccagcgc tggcattgtc cgcctctgga gtccttgtta caagagaatt ataaactcct 240
gttgttgaga ctttgagacc ccatggcgga gacggagggt ccttccactg cagcacaaag 300
tggggcactt gcagtcacat cgcctgtgtt cacggtggag cggatctact gcccttgtag 360
ggctgatgca ttgcaagggg ctgaacctcc tgcactgtct cctcttggtg tatggagaag 420
gaca 424

<210> 122
<211> 197
<212> DNA
<213> Homo sapiens

<400> 122
tgcggaaatg ctctatatca acacttggcg aaccacggaa gacnngcncc ctaattcctt 60
ttctcctgct gtctgctagg ttgagttaga aagcttactc ttcgagatac tactcggctc 120
gctatntgnt tnttgccatt nttcaaaatt tnggtacana ttgattcttc aataaaagct 180
nnaacataca attaaat 197

<210> 123
<211> 146
<212> DNA
<213> Homo sapiens

<400> 123
atgacaactg gagtctggaa gtacagggaa ggagaaaagc ccagcgcatt tctgaaaagg 60
ggaaggagca tggccctgca gctttntcta gatcctggtt ctncagcatg ganggaaaaa 120
catctcatcc aatcaaaatg caagcc 146

<210> 124
<211> 229
<212> DNA
<213> Homo sapiens

<400> 124
gaaacgacna ngccnaatag aaaattttct aaaccccccat gaagctagaa aacatggatt 60
agtatgagat gagaaaacca aggctaagag aggacaggag tatctcttct ctacacaaag 120
ccacttgagc ccatttgaaa tgtaactttt gccatggaag aattctacca acacntttgt 180
cgtcatttaa actacccact aaataccttt tctatttttt atactattt 229

<210> 125
<211> 500
<212> DNA
<213> Homo sapiens

<400> 125
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gtttctaggc ttccaaggac acccttcagc ctactgcaat gcagcttctt accctactcc 180
tccatggaca gatgacatcc atttctgaaa tccaggggcc acacttcaat ctatctcatg 240
aggtatctct gcttggtgga caccgatgtt ctcccttcct gaagactctg cttctctgac 300
ttctgtgagc atagcctctt ctggtcactc gttctctggc atagacttct tctctgtggg 360
ctggtagcga acagtggggc cttcagcatc attattgctc aggtcagtac aaaggaccac 420
ataagggagt atgatagtga ggagccaaga tcactccata tctcgagaag agatgatagc 480
agcctggaat ggtttggtgc 500

<210> 126
<211> 167
<212> DNA
<213> Homo sapiens

<400> 126
actgaggtgg atgcgnccat cttggaagcc atgttaaaga aggcagagcc acaagataga 60
tgcagccggg ttctctaaat caccactggg gagaaaccca cacaccaatg aggaataccc 120
attttttgga ttttaagagc aagaaataaa cttcaattgt gttcagc 167

<210> 127
<211> 63
<212> DNA
<213> Homo sapiens

<400> 127
accttcgggc aaggaccttc acaagggatg cagtacatgc tgttgaagaa gaaaaaaaaa 60
aat 63

<210> 128
<211> 340
<212> DNA
<213> Homo sapiens

<400> 128

cccaagctgt tggccaagga gcttcttgac cttgtggctt ctcacttcaa tctgaaggaa 60
aaggagtact ttggaatagc attcacagat gaaacgggac acttaaactg gcttcagcta 120
gatcgaagag tattggaaca tgacttccct aaaaagtcag gacccgtggt tttatacttt 180
tgtgtcagag gggatgccac ttgaatctcg tgaaacctgg gtagtttatc ccaaatagga 240
gtggtcgaaa cccagcagca aaccacaggc ccatctgcat ttcctgccaa gggaggatac 300
agcttaataa catttcagaa acaataggca tttttctgtc 340

<210> 129
<211> 594
<212> DNA
<213> Homo sapiens

<400> 129
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agttctctgg aatctgagaa gtcaagcagg gcttctgcct tgttcatggt gagcctaaac 120
tgtgatttcg tctctagaca tgacacatca ggcatgcctg gatctggttt ttctgccaag 180
ccttctgaca gtaacgcagg catttgctag tgtatatgga ggaaggctga cttgaagtcc 240
ccagtacatt tcacccagtg agaagaggac aacactgact ccagaaagcc ttttgctgac 300
ctgctctttg aaaccagtgt gcctgccagg aatcctcgcc ctgtgccccg cctacactca 360
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acttcattac cactaaagaa agcctcctcc tgggtcccca tgctccagtc tggctccctt 480
ccgatgcatc tcccctgcag ctgtcagtca ttggtctaaa atgcaaatct gaccatgcca 540
ctctgcttaa aactcttcaa tgactatgct aacattaaag atgaagcaga ttcc 594

<210> 130
<211> 152
<212> DNA
<213> Homo sapiens

<400> 130
gctcataggt ggaaggactt gccttgagtc tcagaagaga ctttggactt ttgagtgatg 60
ctggaatgag gtttgtcaaa gatcagcatt cttatacacc aacaacagac agagagccaa 120
atcatgagtg aactcccatt cacagttgct tc 152

<210> 131
<211> 265
<212> DNA
<213> Homo sapiens

<400> 131
cttccaaagt taaatgagat gccagtcaca attcaggatg ccagaggctg gcagacttct 60
ccaagatgga aaaatgaaca tttatcaagc acctgctttg tacacagatg cttactcagg 120
caaatgcgtc acagtgaagc actcacagac atgtacagtc ctccaggaag gtctttcctt 180
accttgaaca aattcagatc cttgccgttc caactgtttc cgtagcttct catttgtttt 240
aatagattct tctaaacgct ttctc 265

<210> 132

<211> 374
<212> DNA
<213> Homo sapiens

<400> 132
ttgatagcaa tgtagaaaca gatatttaga actggagaag cactgctagt ctggtacatg 60
actgagatgg aacagaacaa gaaaattata caaagcagtc agaagaacct gaagaataaa 120
atcagctgga gctactcgtc tcagggaaag cggccttggc tccctcgccc cgagctgccc 180
taggaagcac gttggactga gaggaggcag caccttgacc tcctgtgcat gctcagggcc 240
ctgcatcaga gccttccttc cctccactct ttcttccctt tttctggctt tcttctcttt 300
ctcatcctat aaagaaagta aggtaactta ctaaattaca tacaatcaaa taaagtttaa 360
aacatagcca ggag 374

<210> 133
<211> 496
<212> DNA
<213> Homo sapiens

<400> 133
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taacccacct gcaaatctac aattgagaaa tccatttctg ttgcccctga gatttgtggg 120
gtgtttgtta agtagcaaaa gctgactgat acaagattca aactcaagtt tctttgattc 180
tgtctgcatc accatgctgt ctcactgaac ttacagccct gattcctgtt cctgattccc 240
aagtgtcctg tcctaaaagg agcagagata aatattgnat tcatccattt tctgatgtta 300
taacagaatc ccacactgtt ggtgttctga gtatactgac attccttgac gctagatttt 360
atattggtga ttgcttggtt atcatctctc tcctctatga gantagagga ttttctcttt 420
attcacttta ttcatttata tccataccac ctggatcagg ttctggcaca taataaatgc 480
tcaatggata aaaaag 496

<210> 134
<211> 197
<212> DNA
<213> Homo sapiens

<400> 134
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gagctgggat gtgaacctga gcagtctggc tgaagagtct gctgtattca ccacacagac 120
gctctacttt tctgacatcc ctcttagagc cacaaagatg ccattccttg ccctcaggaa 180
tgctcaaggt tcccccc 197

<210> 135
<211> 209
<212> DNA
<213> Homo sapiens

<400> 135
gaaacaaaat cttcagactt gcttccaaag gagaagtttg aaatggaagg gagaaagaga 60

ggaagggagg gacggcaaga aggaaagaag agaggangga agaaagcaat ggcatgccca 120
tgtttctgtg ttgtttttc ctactacaaa atattaagat attggataat aaaggagcca 180
aatagtgtca catggctcac gtgtgtatc 209

<210> 136
<211> 135
<212> DNA
<213> Homo sapiens

<400> 136
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tgttgccaag ttttgaactc tactgaacgg aaccaaaaat aaaagtctaa gaccaaagtt 120
gcaaaaaaaa aaagg 135

<210> 137
<211> 461
<212> DNA
<213> Homo sapiens

<400> 137
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cccagctctg aagaccttt attttgtaag aatcattgtg aaggtatggg cttggcaaat 120
gaatggaaag atgagcaatg ggagaggaaa gaattgaagg gggctgtgag gtttgaagaa 180
tggcatcccc catgaagtgg cgctgaaaga tcacgatagc acagttccgt gatgtgaaat 240
accacaagtc tgcaattttt cggtcttgag agtgtcgctg ggctgagagg atggaaatct 300
ttcagtaatt ataccagttt gtattcgtct cacatttggg accaaataca aatccgatcc 360
actctttctc cctgtgaata ttcataaaaa accnaagtgc caatttctgg tctaatcatg 420
tatggaacca aatatgttna tgaagcctaa gtatatactg g 461

<210> 138
<211> 279
<212> DNA
<213> Homo sapiens

<400> 138
gcattaagct agaacntgag gaaagagaca ngctntggcc tgaactcaaa acttagaaga 60
catgagacac agagagggaa tgaaagccac agagagagaa aatgaatctc aagaggagga 120
caggactgta ataagcgaca tcatgaagtt agaatcttcc agcagaagac tgaaatactg 180
taactgacag taactgacca tctggaacac tataaatgtc ttctttactt cttactttgt 240
ttatttgttt gcttgcttgc tttaaaaaaa aaaagtaaa 279

<210> 139
<211> 249
<212> DNA
<213> Homo sapiens

<400> 139

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taccagtttc ctcagctctt ccggcacatg gaccatgatg gctgccccca gatggtgcct 120
tcagctcccc agtcaccatc actgtggtat atgctgttgg tatctcaccc cgatgccttt 180
actgggctga tgtccttatc ttgcagctgc tgtgggtgtc agttaataac agctcatatg 240
tgtaccctt 249

<210> 140
<211> 593
<212> DNA
<213> Homo sapiens

<400> 140
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catatgtgag tctccccacc actagaactc ttaagtggct gctgttatgg aaggtcaggc 120
tcataatcac tgcatattaa gtccttaaca gcaatgtctg gctcttcatt aatctgtaaa 180
cttactgatt taccgagaga tgtctttgtt tttctcggcg ttttttcatc tacttctcac 240
cctggtgcca acgcaatttc cagaaaatga aacaatgatt agtttatgct attgcatatt 300
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gttgttatgc agttagtcag agtggaattc ccacagattt tttcccccaa tgtatcacat 420
aacaataaga gagctagaca caccttgtgt agttttaaca agtcttcgca gttttactta 480
atttgnttcc cttccctttt accccctgagg ctcccaaagc aaatgaacca ttcaggagca 540
taaaacaagg ggaattagtt tagacttcaa taaaacacag acctcttgct tgc 593

<210> 141
<211> 206
<212> DNA
<213> Homo sapiens

<400> 141
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ccctgagctt gcctttgggg tctgtgagtt tgtggagaaa gactctccat ctctgatcct 120
ctggtgtttc ctctcctgta aaaagggaac cgtggtgcct ctctcgaaag ccaatttcaa 180
gcactgaaat aaaccaatgg gcttag 206

<210> 142
<211> 34
<212> DNA
<213> Homo sapiens

<400> 142
tgagccgaga ttgtgccact gcactccagc ctgg 34

<210> 143
<211> 290
<212> DNA
<213> Homo sapiens

<400> 143
ccggcacacn aacaagctgc ttgggagtca agaggaagac atcggcagaa gancacacag 60
cggctggnca tcgngaggnc attgggagga gcacaccagc agaagaacac accagcngac 120
nctggnaagt cnacccgcan aacaacggna agnttggcca gggtagttgg aggacagncc 180
agccgctggg tggcccaact ccaggggaaa accaccanct tnccactnca tccccgtnct 240
gtcctcccca tccaccttgc tgagagctnc ttccactcaa taaaaccttg 290

<210> 144
<211> 189
<212> DNA
<213> Homo sapiens

<400> 144
tgatgaagaa tgattttata caatgaaaga aacaagtcat tgttttcttc atccatggca 60
atattctccc tgtctttcaa gaaagattga aaangtcttt cagattgtag taatttgaaa 120
agttgtaaaa gattgtaaaa tagaggcata tttatcagat ttgggggaat aaattttttt 180
tgaaaaagc 189

<210> 145
<211> 570
<212> DNA
<213> Homo sapiens

<400> 145
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ttttgggaa acccaaggtc tttcngcctt naggggggga agcatcttgt tgggaaggtt 120
ccttaaggtt natttgggat ccctcanttc caanagaagg gggccctggc tccaataccc 180
ccagaaaggg aaaggggaaa atgcttgcca ccaggaggna gggccccaaa taaaggaaat 240
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aattttagaa ttcaaccccc cctttttttn gntcccaaaa tcaacctttt tttnttacca 360
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ggggccaggc ggggccttct tgggaattct ttttgggggg tcctttcaat tttcttggna 480
aangtcctcc ccaattgngt nancaantaa caaaaccttc tttggaatca aaaaaaaaac 540
caatttnggg gaatnggccc tttttccctt 570

<210> 146
<211> 770
<212> DNA
<213> Homo sapiens

<400> 146
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agcagggatt ggaccacccg ggatcctctt ttntctccct cccaaatgcc ttgcaggtgg 120
gatatcttgg ggactaccat tatgccagtg ggggaaggaa gcttgggaag gggaagcctg 180
gtttaccaaa accctcaagc ccatttaagc catccccccaa gctcttgttc ttttttggag 240
gaaaaggaat ggacctggaa gnaaggggaa aagggtgggg tattttggag gaaaaaaacc 300
aaaaaagcca ttcccaagcc cttttgtnga aaaggcctgg aagccccttn aaaggggtcc 360

ccccttcttc ccaagccccc ttgggcttgg acccccccagg aaccccttcn gtttttcttt 420
tcttcttggg cattnccaaa ctttccaaan gggaatttgg ggccctngnt tttcccccctt 480
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nggctttacc cttaaaaggg gcaaaggncg gaaatnggaa gttctttttt tttcaattcg 660
gnaaaatggg aggctnggna atttttnccc cttcacntta tngggnaaca aaaccaaggg 720
ggggccttta aancaaaant tttaaattaa aaaatantgg cctccaaccg 770

<210> 147
<211> 449
<212> DNA
<213> Homo sapiens

<400> 147
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acagggacat atattgtcct actgcccccct gtggttagta cgatttgtct gactagctag 120
ttattaatag ttgtcccctt ctcctaccac ttcaagccca cttcaaccag ctccttccaa 180
atgctcaaga gaagacttca gaagaaattc aaagttttca aaatgatgtt ggattgaaag 240
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tgattgtgta tagccccaag ctaagaatgg tttttacatt ttaaagtagc tggaaaatat 360
caaaagaaga gtaataatat ttttgtgaca catgaaaatt catgaaaatt caaacttcag 420
tgtcccgtaa ataaagctta ctgaaacag 449

<210> 148
<211> 256
<212> DNA
<213> Homo sapiens

<400> 148
gaaagtagta gatcatccaa aaaggcgatt tggtatcccc atggatcgga ttggtagaaa 60
ccggctttca aattccagag gctaattgac tccaattatg caacttcctt gggtgaaatg 120
tcacagcaat atggaagatg cttcactgaa gttattcaca cttcttaatg attaaacttt 180
taaggaactg accttctgca aatcctttcc aaagcttgaa cttcagtcca tcacattaca 240
gcattgttac agcttc 256

<210> 149
<211> 393
<212> DNA
<213> Homo sapiens

<400> 149
ggaatctcat caaacaacca gggaggatca accaccagag aaaagaagag actgggagtc 60
atcaccatgt ccccaacaga attttcatct atccttctga ggacagttcc aagtgattac 120
ctagaggact ttgcttcata ataagtcaac cttcattcct gtgcagcccc acctctcacc 180
ttcccaaaat gtctgcctcc catcttctgg gtccattcat tctctcaaat gatttgctgc 240
ccctcaaaag aattttccac gttcctcatc tctcccctcc cctgggaaaa agcatatata 300
agcttctata ccaccctggg ttattgggta atcattctcc agcaattctc ccatcctgtg 360

cacatcaaat aaattctgta tgcgttttct ttt 393

<210> 150
<211> 488
<212> DNA
<213> Homo sapiens

<400> 150
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ctctccattt atctcactga tgcaaaggac cctgagtagg gatcctctgg aaacagaaca 180
gagggaagaa gataccttcc ctgaagccca gatgttccag aagcctgcgc ctcattcaca 240
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acacaggtgg agagcggcct gcccgtcttt tccatggngc ccacagaccc atttaggatg 420
aaagancana aaattttttt ccntgtaccg gntntggaac caggggaaat ttatatttgg 480
ggcccttg 488

<210> 151
<211> 443
<212> DNA
<213> Homo sapiens

<400> 151
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ccagtcccaa caagcaaggg ccttcctctg atgtcagaga cctcaggttg caagaaatgc 120
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ctgcgacaga tactttcagg gaatttatgc cccctccccc aagaacaaaa gggctcctgg 360
gctcagttat catttgttct gcgagagaat ttacagtctt ttcagcaact tcntttaccc 420
tactcataaa gcgcttattt tga 443

<210> 152
<211> 290
<212> DNA
<213> Homo sapiens

<400> 152
atttgcgaag agtgggaaag tgagcattga gcatactgga aataccaaac gcagacgccc 60
tgggatgagg gtccgcttgg cgagcccagc aagagcaata aggcctgagt ggtggaagtg 120
gggtatgcaa gaacgtatca ttcttgttgc ttttacctgc tgcttaataa cacgcatgta 180
ctgtctggca ggaaataaag agattacgtt tcaaaaaaaa aagggccagn gnggccantt 240
cagttngnan ttanccaggn tgaacttgnt naaanggggg ggactaccca 290

<210> 153
<211> 508

<212> DNA
<213> Homo sapiens

<400> 153
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atctaggaac tctctctcct ccagctggaa agaagaagca tttattacct cacagtttct 120
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gcaatccaag aggatgagac aaagaattta agactgaagc cacagtcttt tatcatttca 360
tcctgttaga gttatcctat cagttttgaa gtctcantgg ttttagaacc agtcagtaag 420
tcacccacac tcatatgagg gataccaagg tataatgccg gagcagattg tgaagcctct 480
ggagctgctt ccatggctgt atgatctg 508

<210> 154
<211> 81
<212> DNA
<213> Homo sapiens

<400> 154
agacgctggg gagctcntga ataaaaaaan aactgngtna tgggacgcat ngacccanaa 60
agcagacctg ggcccacaac t 81

<210> 155
<211> 416
<212> DNA
<213> Homo sapiens

<400> 155
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cttccagagg ttctggatgc aaattaagtt gcttctcagc ttccccccact gctggctgat 120
ggttgagatt tcctgcatct tccagaagca aaatatgctg aaattcaaga actgggcatg 180
aatgactgtg tcactcgcca gagctgagcc acctccaagc agtgagccag gccaatcatg 240
tgaggccctg ccaccttcag acagtgtcct gtccccttc accaggaaca aacagaggac 300
ggcctgtcgc ctctcagctc cctgcctgcc tcagactttc acatactctt tatcaagttt 360
tacagagctt ttctgactct gtaacaaaca gtcaaataaa aatgctggtg ttcccc 416

<210> 156
<211> 403
<212> DNA
<213> Homo sapiens

<400> 156
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ttagaagcct caccagagcc aggcagctgc agaagcctct tttaaaaatg gtttagaatg 120
atgactggac ttggcagcaa cttgctttgg aagcaccaaa caaaaagtgc tatctggtgg 180
ttgatttgat taactgcaat ctagacatcc attttgtgga ccgtattcac ataagcaagc 240

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caacaaaggc atgttgggag cagccaggag cagttctggc gcttgggagt gaaggaatgt 360
tctgcctaat gagtgccaga tgaaataaaa tctttgatat att 403

<210> 157
<211> 104
<212> DNA
<213> Homo sapiens

<400> 157
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gngganaant atctgaacta aaagctgaac tcaacaatga aaag 104

<210> 158
<211> 636
<212> DNA
<213> Homo sapiens

<400> 158
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ccttgacgag tcttccatca gagacatttc aagatgcagt atgaaaacta aaaggctctg 120
ctctaacaga actttctgcc cagccataac acaaagatat caagaagaaa ataacaaaat 180
actgtcataa gaaaatgtaa cacaaataaa gatacagtac tccaaagtac cgaggatgcc 240
aattataact taccaatata acttcaggat aaactctgac atctcctttg tgcaggagct 300
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ggtcaaacca gtgactctca ccatgtaggc agccagtggc tgggggatgg ctgctgctgg 480
tgtgatgacc cctcctcata aatttaaact taaaagacca tctttgatgg tcacaagctg 540
tgtgatctct gctcaccacc ttgttctgat catttcccaa gtgagaacca cgaataatat 600
ttcactncta tgatctttat atncaccacc aaggat 636

<210> 159
<211> 383
<212> DNA
<213> Homo sapiens

<400> 159
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aatggattct ctcattatag ctgtccatac tgngggaggt tacaggaaaa ttctacaaat 120
gccaacaact ggtcaaatat agctggatac attatctgca tgttttctgg tcctacacaa 180
atggcctata aaagcaaaat aagaacatta gaatgcataa tctgaactcc attaagttct 240
ttactgtgta tatatttgtt taaccacaga atcttaaaaa ctgtcttatt ttatgtatta 300
taccatcttt tctgagccct aaaggacaca aactatttta aactgttata gaataaagta 360
taggctgaaa ctgttaatca gct 383

<210> 160
<211> 162

<212> DNA
<213> Homo sapiens

<400> 160
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acagaggacg tcagccctgc catcactggg ctggggaaac aatgccagct atggctggtc 120
tccgggttca cagtgataag ggaaataaac ccttatttgt ct 162

<210> 161
<211> 276
<212> DNA
<213> Homo sapiens

<400> 161
caggcncaca aacaagcngc tgggagtcaa gaggaagaca tcggcagaan aacacacagc 60
ggctggncat cgngaggaca ttgngaggag cncaccagca gaagaacaca ccagcngaca 120
ctggnaagtc nacccgnana acaacggnaa gnttggncag ggtagttgga ggacagncca 180
gccgntgggt ggcccaactn caggggaaaa ccaccanctt ncnacttcat ccccgttctg 240
tcctccccat ccaccttgct gngagctact tccact 276

<210> 162
<211> 284
<212> DNA
<213> Homo sapiens

<400> 162
gtaccctaca aacatcatca gcccatcagc tgtgtgccac aggaaggctg ggaagcacgg 60
ggtgtacaga aaacaagcaa ggaagagaaa aggcactgaa gcagaactgg tgaatcaaca 120
gtgcctgtta aattggcaaa tcctgaaaca ctcaacaaga accttggctc cagaggggac 180
aacacaggtc ataaaacttc cagggccact gacctcatta tgtgactaca aaggtttatc 240
atttagtcca aaattgtgga ttaaaaataa attaaatgcc atgt 284

<210> 163
<211> 209
<212> DNA
<213> Homo sapiens

<400> 163
ataatgcaag ttctgaagtt ctgaatgaaa aaaattaagt gatatttact attctacagc 60
gacttgttga ggtgctaagg aaagccatgc gatgccacgc ctggcaacaa acccacactg 120
cttcaacttc ctgtgaagaa agccctacca tgatccccac ccacattatt tattttgacg 180
acccaaacaa ataagaaaat gtagccagg 209

<210> 164
<211> 184
<212> DNA
<213> Homo sapiens

<400> 164
cacttggcgc tgctgacgta cagagcaagc aaagccgctg aagttcaaaa cctgcactga 60
atctatctca aacaaagaat gccaggaccc actgcagtga cccctaggat gaagacatgg 120
aatctgttat tatgcaatgt cacttaagta tgtcttttat attaataaaa aagttcgtct 180
tggt 184

<210> 165
<211> 341
<212> DNA
<213> Homo sapiens

<400> 165
gaaagaacat caaggctcag ggtggtggga ctctacttcc ataagagcaa tgatccattg 60
ggtgaccagc acggattgtc ccacagcccc cgatggaaac attcagaggt gaatgccttg 120
ctcagagccc cctggccagg ctgaggaggg aaaaattctg ctttccaact ctggcaagaa 180
attgctgcat ccagaggctg cagaagccca cgaggagcat gaagatgcgt gggaagaata 240
ggcgctgcct tgagtgacat cctgagccag acccttacac acacagcttt cattgttggc 300
ttttgtgttt ttttttttt ttaangnaaa aaaaaaatcc c 341

<210> 166
<211> 419
<212> DNA
<213> Homo sapiens

<400> 166
agtcctgcat taagtcgact gaggtggata atgaagtgaa aggaagcaga agagagtgtt 60
atagttggaa aggtgggaaa tcaccccctc catgctgaag ggaagatttc aggttccaaa 120
tgacacgttt ccctcagaat gacttttgct gtagtgacca tggatatctt tgctgtgttc 180
ctgaaactct gcagacagtc ctaagggatc cagtgggtcc tctgatggac cccaatgctg 240
gaagtcacgc atatagctct gaagagttgt cacaagaaat ggcgtttctg gaggatgcac 300
aggaaacttt tcatttggca tgaaaaaggc tattggattt gcaaagactg cagaggaaga 360
agtttaaatt cttgagcccc ctaaaaaaaa atttttaaaa aagnggcttc caacctttg 419

<210> 167
<211> 177
<212> DNA
<213> Homo sapiens

<400> 167
agaactgagc tgacatggac agaacttcca gcaggacctt gaatgttaac gcattacaga 60
tgccagaacc tctgtctacc taaggccctc agtgactttg tgaagcagag tctcacctcc 120
aggctggaaa catcctggac tattacatga acaagaaata aacttcactg tgctgct 177

<210> 168
<211> 439
<212> DNA
<213> Homo sapiens

<400> 168
gatatgaaca cgaagcaggc agaggatgaa gctgatggtg tgcatggtca ctgtgctcct 60
gcccattttt gagcttctgg aatacaagct gtgcctttgc ctggaatgtc cctcccagtc 120
tgactaggca tcttctgatg gggtttgacc tggttgcttc taacactagg atggacctct 180
tggcaatctc tggatatctt tctgtggttt gttataatgg gagaagaaga agcactccca 240
tctagattgc tgtatcagaa tggactgtta tgattgcaaa tggcagaaac ctaactcaat 300
gcaactataa naatgaggga aatgtcttgg cagctcttga aatccatgga agaacaaaat 360
gatccaggtg ctggagggac agcaacagag ctggacctca ngtgctgctg gagccagagg 420
ctcaattttc actagtctt 439

<210> 169
<211> 393
<212> DNA
<213> Homo sapiens

<400> 169
cttctgncac gtnccgggtc ccagagtgtg cctgctcaga tcccaaaaaa cttgcnggan 60
caggangngg tcacanagtg gttaagggga agggagaaca ggaccggcgg gtttctttac 120
cgcgggtcaa gaacccttga aagncntctt cggcttcatg taacgcaaac ttggcccaca 180
ttcacttttc cccatgggcg gccccaagtc cgaacccaga tgcctctccg acgacagccg 240
caaagcgtaa ggcaggtcgt tattccagcc tctaagcgct ttacagcgcc agatggctcg 300
cgcacgcgct gcgtcttagt ataggtcctt gttaatagtt agaagtgctg ttctcattga 360
tataggaaaa taaaactact tgtatgtctt atg 393

<210> 170
<211> 227
<212> DNA
<213> Homo sapiens

<400> 170
caccctgaac tagaangggn aangnaangt gccttgngan tcacncggcc acaacgaaaa 60
ntagttgagg cncggcgccg ggggcttcac gcttcttaat cccagcactt ttgggaaggc 120
ccgagggtgg ggaaagaatt ggctttggaa gcccttgaag tttcgaagaa cccagcccctt 180
gaagccaagg aagtggaaga aacccgcccg ttttcaaact agggggg 227

<210> 171
<211> 808
<212> DNA
<213> Homo sapiens

<400> 171
gaccttctgg ggggagncta nctggcattt angtncagaa cctgcccctt tctttttaaa 60
aaagaacaac ttcaaagnat ctgggcaacc acttgtgccc caaagctttc ttcttaaggg 120
aaagaagaat tggtcaaaag tgttgggtgc cctgggaccc agcaagcatt angccatcac 180
cttggggacc caagttaaga aaatggaaga atgcttcaag gcttccatcc caagaacctt 240
gcttgggggc ttgggggccc caaaccaatc ttgtgttttt aacaagggcc tcccttgtgt 300
tgactggtng atacgtggat gcttccaagg gtaaattggg cccacttgaa agaaaagtaa 360

aaaggaactg ttctacacct taaaagaaag ccaaagggga cctcaaatta caggccattg 420
cggtttactt ggcattatta tcaattttaa aaaatattca aaaattaaat ggggaaaggg 480
gaaataaaaa caccagggct taaaaagggg atggaattta aaaaaaaaa agaagtttaa 540
aaaaaaaaaa aaaaaaaaa aaagggccan gcngggggcc caatttcaan ttttnggaan 600
tttaacccan ggcnttgaaa cntttggttc naaaaaaggg gggggggggg aacctncccc 660
cnannnnnnt catcccncnn tcacnatntt nttgnnacnt tacttgnntc ntctacattc 720
ntganctaca acattcatct tatntantta tntatccncn tnacncnctn anntttttnc 780
acttatttnc ccannettat atatatac 808

<210> 172
<211> 649
<212> DNA
<213> Homo sapiens

<400> 172
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cccttcttgg gangaaaggg cccttngnat tggtggaatg ggtggtccaa cctttccaca 120
aagtaccttc ngggccaaaa aggagggggt gaccaaagtt tcaaagctca aaccaaaggt 180
caagaaactt aaaaggggag cctgcttgac cccgggggag cttgccccaac tttcttggng 240
gggaaaaaag gggaccaaga atggaaagct tnctttcca agaaaagctt gatggaagcc 300
aaccttggga ccagcaaaca agggggacca aacggagggt gggacctttc ccaaagaagt 360
acttggtggt ctttcctggt ccttgcatcg cccattgatg ttgttaaccg aaattctttt 420
tgaaaagggc tttcccaaga taaagcaagc cccaagggaa agaaaaatga aaaactcctc 480
ttgatgttgg gtttgggggg ggggtcttgc caagcttggg gggccctccc ttgtcgccaa 540
gtgggggcca cttttttttt tttcnncctt tgnttctttt aaaaancccn nctttggntg 600
ncttnnanca anggtttnaa ttaaaaanaa ttttttggga aaagttttt 649

<210> 173
<211> 271
<212> DNA
<213> Homo sapiens

<400> 173
tttcccggag tggggatatg aacagcccgt cttgggtcct gnggggtggaa gccnatgtgt 60
ggaagaatgg agggcatcgg ttagaaagga gtctaagtcc ctgatgggca ctgagctgca 120
agaaccagcc tgggctgctt ctgctggatg tcacttacta gagagcgaaa ttaaatgtgc 180
ttcagctact gttactttgg gttttctgtc atttgtagct gaaataatcc taatcaatat 240
gagatatatt aagtaaacaa aaatgcaaat g 271

<210> 174
<211> 272
<212> DNA
<213> Homo sapiens

<400> 174
caggaaactg gnagggaaag aaagaactgg ccaaggggga ccaaatcttt ggttggaaat 60
cttggggcca ngaaacccct taanggagga ngantcctgg aanttggaaa ncttaatggt 120

tatttaataa ataaaattgg tggtttaatc tttcaaatcc tgggggccat gggcaccaca 180
caggggaaac caatttctgg gcctggaatg gcttgcttca aaggcttctc cctcttttgg 240
gaataaaata aaatgggctt tcaggttttt tc 272

<210> 175
<211> 267
<212> DNA
<213> Homo sapiens

<400> 175
gactgagctg cttggcctgc agaggaagcg ggaagcagtc agatgcaagg cacccaggtt 60
agaattcaaa tgctgcaggc accggggtct gcatgacagg acggctcagt ttacgctgta 120
gctgaggaaa ctgaggcaaa gaggacgagg aaagctgccc acaatcaccc tgctatggcc 180
caggactgca gttcagatcc caggacttcc aggctggtgc tttttccacc acggaaaata 240
ttaaagacta aataaactac aaacatt 267

<210> 176
<211> 332
<212> DNA
<213> Homo sapiens

<400> 176
gcatgagcac caatgactaa attggggaag aggaactcaa ggggagaagg cagctcagaa 60
tcaaagattg aagaattgta tctatcttca agttcacttt ctctgtcatc tctattctgc 120
cgttgtgcca tcagggtcaa gcagcaagaa gataaacaga gaaaaaaaat taacagttat 180
tagccccacc ctaatgaagc caaagagttc cactgggaaa gagcaactga aagctctgcg 240
tttgaaactc tcctggactc agtctcatgt atctcccact ttggctgatg acgatctata 300
tcctttaact gtaataaaca aaccataact gt 332

<210> 177
<211> 908
<212> DNA
<213> Homo sapiens

<400> 177
caggaaactg gcagaggggg agtctcactc ttggtcgccc agggctggga agtggcangt 60
gggtggtcaa taagccangc ttcanccaac aancctcttg gccttcttca aaggttcaaa 120
ggccggaatt tctttccggc aatcaagccc ttccaagggc aaaaggaatg gaaaacccac 180
caaaggaaga aaaggccagg aaaggggcaa gaaaaggaaa ggggaccaaa ccttggctta 240
ttaaggaact tgggaatggt tttgggttgg tgccctttca aaaaaattat gtttgaaagc 300
cttcaatcac caagttgtgg atgaccattt gggatgtggg gggccctttt gggggaaggg 360
tggaaatggg ttggatgaag aagtaaaaag ccccgtattg aaatggaaac cgaaatcctt 420
gttccatgcc attggaagat ttatgacctt tataaaaaag aagtttcctt aagaagaggc 480
catcctcatt tcttccacca tgtggaaggt ttaccaaatt ggaaaagata agcttgtcta 540
tgaaaccaag ggaaaacaag gatcctcacc aagaacacca agatcttgta agggcaccct 600
tggatctttg gacctcccca agctttccca caaacgggtg ggaagaaaat ttctattggg 660
tttaataaag ccaagcccag gttggatggg caattttaaa tattaagcaa gctttgggaa 720

ntaggaacaa gggacaacca aaccttaagc accaaaaagg ttttcttaag ggatgcctta 780
cttaaaaagg ccaccgacnt ttaatgggga aaggtttaag tngcctctta aaatggccat 840
aatanttaag ttaaaaggna aagnaaaagg aatggtggga aaaatcaaat gggatcaaga 900
acctccaa 908

<210> 178
<211> 274
<212> DNA
<213> Homo sapiens

<400> 178
ctgccgcctg ccggacacac aanngtcctg tatgggggaa gtggaccagg gtcntattca 60
ancccсttcc cgtttattcg gangaatgga tggcnttaag taccangnca nccnttngga 120
gggaaactng ggcctcnggg aaccaaaggt ggaaccctng aagaactggg gtggggcttt 180
cttaagaaac caagcccttt acccaaactg gtacccttc cccttttcttt ggctcaagcc 240
caaataaaat taatattccc ttcttttcaa cttc 274

<210> 179
<211> 526
<212> DNA
<213> Homo sapiens

<400> 179
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gggnccagng acgggntnac agcacacggg cggacctacc tacacctccc ggctcaagct 120
atgctcctgc ctcagccttc ccagagttgg gaggcgtggg atcaagtcct agattggtca 180
ttcctggctg tgtgactctg ggcaagatac tcagattctc tgggccaccg gtttcttgca 240
tgttacaaaa gcctggttac atttctcata tcaaggagat acaaagttgc ttcaaactcc 300
tcagccacag gaactgtctt attcatttct gtatccccag cgtcctgaca cacagtaggt 360
gctcagtaaa cgttgaatgg atacaaacat gactgtgaag agccttgtaa acatcattaa 420
ccaaaatatg tctatatgta tatatgttag cacttactac aacaggccca taaacctttc 480
caaaatgaca tcaacaggaa gtaaaacctg ttttggatgt acccat 526

<210> 180
<211> 730
<212> DNA
<213> Homo sapiens

<400> 180
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tccgtggaaa tgccataccg ccaaggaact tcgggangggt aggtttcccg ggtttcccgg 120
gcggtgggcc catttttcg gtttgggtgg ggtggttcaa gtttggtggg ccgggtttgg 180
cttgggtcaa gtaaaccaag cccaaagaat ggcttgcggg aaatcttgct gggctctttc 240
cgtcaagatt ggggccaaga agggaccgaa taaagccact tgctttcccg cagggcattt 300
taaaaaaaat aaaaggttcc cgggaagaaa gccaaaaaaa aacttgttcc caaggggagg 360
gatggatgaa aaattccact tgtatctaaa agggggtggg ggggtaagct tgatgcccctc 420
cttgtataag aagcccaccc attggattct tacaagtttg ggtggggaaa caagcatatt 480

gccatatatt gaagcttggg cttgtgggct ttcatttccc aaaggaaagc caagggaagt 540
tgacttcaag tcatcccaag ccaaatccgc ttgggttcaa gttttcattt caagctctct 600
tatggggacc aagtaaatct tgganaaaaa taaacccgaa gctccttctt ttggggggat 660
caaataattt atttggactt tgtaagttaa acttgccacc caaataaaaa gccaagtctt 720
ttacccatgg 730

<210> 181
<211> 622
<212> DNA
<213> Homo sapiens

<400> 181
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aatcaaacca agtacaatcg gcaagaagaa tgggtggcgg gcaatggccc ctgggaacgc 120
cccaaccaag caagtcccaa tcccccggct tggtcccttg ggaagaatcc cccttccaaa 180
ggggaagcaa ccccaataat ggaacggccc gcccaaaggg acttccattc ccttgcgcca 240
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cctcataagc cctcaagccc tttccctcgt ttccaagggc ctctccccaa gggcttgcca 360
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ctccattaaa agaagggcta agggtggaag ggccgctttc taagggtttg cttgggggggc 480
tcttgcttgg gttaaaggga aacaagggga aagccttgga ccaatctccc tccactacct 540
cttcccttgt gcttggntac acaagtgggt catttgtttg gatgttaaaa ttaaaaggtc 600
aataattctt ggcttctctt cc 622

<210> 182
<211> 412
<212> DNA
<213> Homo sapiens

<400> 182
cacacaggac acggtgggga tgcagcatct tggacctcat ccgcctgtgc tctaattcaa 60
agacaaatat gtttcccaac ctgcccaagg ctctggcagg gaaaactcag atccccaaac 120
tcaggtcgtt ctagtgcagc aataaccagc tgggttttca gcaacttgga tggagccatc 180
tgtgttccca gcccacataa aaatatgcac aagaagggtg caaatcagca agtccacagc 240
ttccagaggc cccagctggg atgtgccctc cctttgggga ctaatgaaag agcccaagga 300
agtcactgaa agctagatat agcaaaatgg tagctcaaca ccagatgcaa ttatttaata 360
ataaactcta aatttgtttg ccccccttaat aaaactctat attccaatat tc 412

<210> 183
<211> 899
<212> DNA
<213> Homo sapiens

<400> 183
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ggngacttga agacnggcgg agccggctan aagccggggt acgagcccgt acttgcccgc 120
ttcttagaat tttcttttgc ntcctcttat gggggtaagg aagccgcaag cctctctttc 180

ngcccgggaa aaggatttaa agtttccgtt gaaatgccat taccgccaag gactcgggag 240
ggtaagttcc cgggttcccg gccgtggcca ttttcngttt gggtgggtgg ttcaagtttg 300
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tggccttctt cggtcaagga tttgggggcc aaggaaggga ccgaataaaa gcacttgctt 420
tncccgcaag gccattttta aaaaaaataa aaagtttccg ggaggaaagc aaaaaaactt 480
gtttccaagg ggaggggatt gaatgaaaaa attnccacct tgtantcttn aaaagggggt 540
gggggggtaa gccttgaatg ccccttccct tgtantaaga agcccacccc atggaatttc 600
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cttnntgggc ntttcatttt tccccaaaga aagccaaggg aagtnggaac tttcaaggtc 720
antcccccan cccaaatcng ccttttgggg ttcnaagttt ttccaatttc naggcnttnt 780
tcttattngg gancccaagt naaattcttg ggataaaaaa tnaaaacccc gangcctttt 840
ttntttttgg gggggattcc aaaannantt ttaatttnga cctttgtaag ttaaacctt 899

<210> 184
<211> 324
<212> DNA
<213> Homo sapiens

<400> 184
aagacatata tgatgtctgt ctgggatccc agcaaccatc ttggaccacg tgaaaacctt 60
ggggatggaa atcacatgct atggatggcg aagaaaacta aaagcgcctg agtcactgat 120
accactttag agctaccata taagcctctc ttaagccttc cttttatgaa agaaatataa 180
aattccatct tgctgaattc ctatctgtgt tactagcaat tgaacaactg atttgccagc 240
catctgaatt acccagattg tctgataatt ggtcaatacc cacttcattt taggatatag 300
aaataaagct tcaaaactgg ccat 324

<210> 185
<211> 176
<212> DNA
<213> Homo sapiens

<400> 185
ggtcagcaga gacaaaggca atgttggtga ggccatgtac attttcatct ccttgagctg 60
gtactgtgag caagctgttc atctctccac gccaacctca atcttcctct ctaaaaaagg 120
gactgatgct actttcctaa tcctgccatg acctttgcaa ataaaacact taactg 176

<210> 186
<211> 268
<212> DNA
<213> Homo sapiens

<400> 186
gaaactttaa tacatcataa ctattcatta atgtatgcct ggcaaagatc aaatgtcaga 60
agatttattc agccacagac actgcaaatt aactacattc atgggacaac caaagcaaga 120
aagcctcatg ttttgggggа aagtttgata tcagcaatgt ccagacaagc aagtgcataa 180
tggaacgcaa cttcatggaa cccaactcag acaggattga cagttgaaga accaactctt 240
taattgtgag aaattaaaac aaatctac 268

<210> 187
<211> 221
<212> DNA
<213> Homo sapiens

<400> 187
aatctcactc tggctgctat atggagagta tactggagaa gaacaagaat ggaaggaggg 60
agccaagttc agaggtgaac aagagctgtg agaagactct gaggccttag gaaatgggaa 120
agctaccggt caaaaggatc ctggcccctg aataactgca cagctctttg ctggtctgca 180
ctgggatgcg atgtaactga taaataaaca tttcttatgt t 221

<210> 188
<211> 540
<212> DNA
<213> Homo sapiens

<400> 188
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gtactctttc cagtaccctg agccagggga gccagcgggc agaaatgacg tgtgaggtac 120
cctctctctc ttcacttcca tgtgatctgt tactcatttt gtcaagacat cctgggtccc 180
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ccatctccag gngccaggng ctacacaaga tactggctat agcagcgaac aggacagccc 300
cgctnattct natnggnggn ccaggacaat aagaaaaaag actttttat ttttattttt 360
ttgaaacgga gttttgctnt tgtttgccca agctggaatg caanggtgtg atctcnatna 420
ctggaacctt cggcttccaa gttcaacaat tattctggct caagcctntt gagtagctgg 480
gattcangca cctgccccac tcccgggtaa attttggggn tttaanaaaa aaaagggttt 540

<210> 189
<211> 258
<212> DNA
<213> Homo sapiens

<400> 189
gcatgtctgc agaaatgatc agacgtatgg aattacaaga tctcctgctc gtttagggtg 60
ttcaaggaaa tcaaagaact gtggaaacca ttactgtcca ggaaacaatg ttgtctttga 120
aagcctcatc acctaagaca tgtctctgaa gtagatgaaa aagccaaccc aggcatagtg 180
gtggagccca gatgtctcac atgtttagca tgagctagaa gacactgttt aagtaaaaat 240
gactaaagcc agcctgcc 258

<210> 190
<211> 334
<212> DNA
<213> Homo sapiens

<400> 190
gacactggct cataagggat ttcaatgtgc acagagcaac tgcctcctca cctccctacg 60
gattccacta caaccatcta ggaggaccac agcagcatcg tctagccttc cccttccccc 120

aggaccctgg gctggggtgg aggaggaggc gccactgcag atccagtatg gtgagaggaa 180
tctcatggct tccaccagaa tccccaaaac cacagcacat cagtttgcta gcttgcacaa 240
aagccttcac cggatgctga gcaggtgctg ggcctgtgcc cttggacttn ccacccttca 300
gaccattaag tcnaantaan ttcctttcct ttat 334

<210> 191
<211> 370
<212> DNA
<213> Homo sapiens

<400> 191
gagctgagct gggttttaca gagttaccgc gaggatttct gttgtgggaa aatacccagg 60
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ggagttaccc cacaatgagt tctgggtctg gtcaaatcac ccattattca aacacattgc 180
agccttcctg ttntttagga aatcaaacag aacttcagca gtatgcagng aggccatttt 240
aaacagngaa atcaccaacn taannccccaa nttttngaaa ncnnggcctt aattnncccn 300
caaaagggaa ncttgttacc nggnaaaaaa ctggaancaa nanggccagn ttcccttgtt 360
ggaccccctg 370

<210> 192
<211> 258
<212> DNA
<213> Homo sapiens

<400> 192
ttcagctgtc atgagaaagt tgagtgatga gaccttgagc gggaatcatc aatgaaaggg 60
ccaaggagat gagatggagc attgtaatca acaaaagtgc taaacaccaa gaagtgttgt 120
cccatatttt attacacttg agaatgtctt gctattttag acgttacaag gtatggcaag 180
acagtcttgt agcagtgcta gaatgattcg ttgaaatgca ttcaatcaga aataaaagat 240
gctgttaata actgtcac 258

<210> 193
<211> 190
<212> DNA
<213> Homo sapiens

<400> 193
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ggaaaggatg gccctgcaaa gtgtgccatc atgagtgagc atctctgtct actcaaactc 120
tgattttttc actgcagccg acttagtgag gaatatgggc gcactaagtt ataaaatata 180
agaatgacag 190

<210> 194
<211> 353
<212> DNA
<213> Homo sapiens

<400> 194
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aatcttgcat gctaactgac tgataatcac tgatggtagc tctatgctaa ggattctgag 120
accaccatgg gactggatgg aacagcatgc tgtgatctgc taatgatgtc tgctatggac 180
accacaagca tacagagtga acctgcagca cagcaagaaa acagagcacc aggctgtgac 240
ttcacagaag gccctgggag ttgcagggaa gaacagagag tcatggcaca tgaggctaca 300
ggaaaaatga ttttaaaaaa agaatgataa ttataaagca tttattgagc act 353

<210> 195
<211> 326
<212> DNA
<213> Homo sapiens

<400> 195
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cctctttacc cagaaggagc tgatcagcca tctttaggca gaaggcttcc tccagctgca 120
cccagattcc ccttctgtct cccacagcac cctgggctta cttctccaga tcatgtaaca 180
ccctgtgcta agattgntta tctcttgnct gacttcttga gtggatcata agctctttga 240
atgcaggcat tgngtcttct cactcgcaac atctccagtg ttgaggacag aagtgcccac 300
agggcatagg atatactcaa ttaagg 326

<210> 196
<211> 303
<212> DNA
<213> Homo sapiens

<400> 196
acaacaagct ggtgagcagc ctcagcctgc ctcctttgtt ccatcagaga tgctcatgtc 60
atcgggttac gcaggacaat tttttcagcc agcatccaac tcagattatt attcacaatc 120
tccttacatt gacagttttg atgaagagcc tcctttgcta gaagataagt taaggaagtg 180
ttattaatgt gtgtacagct agaagaataa tagcaataat tagcacttaa tgtgtgctgt 240
cagcctgcag tatacagtgt cttatgtttg attgtttcac atataacaag agtttgctga 300
acc 303

<210> 197
<211> 170
<212> DNA
<213> Homo sapiens

<400> 197
gtatgacaca cacgatgtct aagcaactgc cttccagcag tgattgattt tgctggttcc 60
ccacacaaaa agtttggaag agacccttat gtcttctgta gagtttcttg gttgtaagca 120
gcaagcactg gtgctggcta acttaagcaa ataaagaata tatcactcag 170

<210> 198
<211> 342
<212> DNA

<213> Homo sapiens

<400> 198
tgagatttat agtgctcttg gggaggctcc tggaagaagt gatatatcan gacagacata 60
ctattcaaaa gcttaaanct tagcatctga ctataaacac catgccacaa agaagcttgg 120
gatgaaggat cacgaggcga gaggagtcca gcgcccagca cacccactgg gagctacatg 180
catganaccc cacccaatca gnagaaccat acngccaaca gaattatgag aaataagaag 240
ntgnngnngg tctaanccac taangctttg gaggggnttg gttnacatcn ataggtntcc 300
ttgcttggna ctacttcaat catttnatgt ttgagagagg cc 342

<210> 199
<211> 280
<212> DNA
<213> Homo sapiens

<400> 199
gaccagatta atgaagatca cagctgggaa cacctgtgat cacacctgtg aagaccacac 60
ctgtgattat gagagaagga aagaatctcc atggaagaag ggtttaagga ggatggggct 120
agaggggaga gaattctggg ctgattcaga gtctgtagaa gaggaaactc cccagctgtg 180
gccatgggac agaggagttc tcaatgcctc ccttctagaa ctagtactaa tatggaagtg 240
gcataaacag ataacacaac agacataaaa tataaacaac 280

<210> 200
<211> 205
<212> DNA
<213> Homo sapiens

<400> 200
gtcttgtttc agtgagaatg taaagtacgt gagctatgtg ctttgtgatg aagtcgttga 60
tttatttcac tttggaacaa gcncaccaca acaaagtgag aatgagaagg tnattcagag 120
ggagaagaag gaaacggaac tgtncgtaga aatatatcct catatgaact tanacnctgn 180
aatanatnta ggttgtcaaa acacc 205

<210> 201
<211> 261
<212> DNA
<213> Homo sapiens

<400> 201
tgggaatatg aaacccagct cccttgctga agatgggaca acaccaaggc tgaactcaca 60
cttgaattca cccacaggat ggggctgagc ctgagatctc atccttcatg gcttcctctc 120
cttccttctg tttcagagga atctgaccta actcacttgt ttagagttac aaacaaaata 180
aatggtgagg tcaggaccta ggattgctgt attgagcaaa taaaaataca ggactcttgc 240
attttatcta gcaataaaaa t 261

<210> 202
<211> 124

<212> DNA
<213> Homo sapiens

<400> 202
cagctcacgc tgctgatgca acacaggtga agagcacctt cccctccccc acctgngggc 60
tgattnccac cacgtggatc ccaaggccat cccaggaact ctttggaggg gagaagccca 120
gtgg 124

<210> 203
<211> 265
<212> DNA
<213> Homo sapiens

<400> 203
atgaagaaca aggccataga aagaaagcca cgagctcaaa ctgaagatgg ggcgggaatt 60
aggattcaaa tccaggtctc cggatcccca agacagcgtc ttttccacaa ggccactgca 120
gccatccatc aatttagaca tgaacctgtt acctatgtgg tcacaatcat gccatataca 180
aactttagcc aagtagcact tttttcctct tagtgctttc tcactcagaa tcaaattaat 240
tcctcaataa agttataaat ccaac 265

<210> 204
<211> 465
<212> DNA
<213> Homo sapiens

<400> 204
ccttccttga agcagcatga cccatctgga tgtcctcctc atctcaggaa ttttctaata 60
agctgtctaa atccagagat ccgaccacag aacaatgaat gccaaagatg agttctaaag 120
atgcgagtac tttctttcta aacggacgct gctttgtgta tggctctgct cctgggggca 180
gacgcggcag gctaagccct gcggaggagg agcaggagac agggacccag agaagtgaag 240
aggcgttgcc ttaggntgca cagcagatga cgcctctcaa gatggaccct aggttgtctg 300
actccgtctc acagctttgc cccatttatc atgaagatga acgctggtaa cactgctacc 360
tacgagctga gcttgccgcc attcctgggg nggacatgca tgcgtgccgc ctcacgcaat 420
gtgctnagtg cacaggaagg gagaccaaan ccccttgagg gggtt 465

<210> 205
<211> 181
<212> DNA
<213> Homo sapiens

<400> 205
agtgctctcc ctggttattc cagaaacacc agtcgctgag gatctctcac ctgcagttcc 60
ctgctggatc ttcattctga ctggtcaacc aattgttcca gtgcattgaa gggctagcat 120
ttcatcatcg aattgctttg tacctatgtt gaaaataaaa tggtgatgtg tatgtggctg 180
t 181

<210> 206

<211> 388
<212> DNA
<213> Homo sapiens

<400> 206
gcaaacaagc tgagagttta agtgatttac ccttcctgaa agaggaggtc atgaacagaa 60
ttccaggatt tggacctgta caaatgccat taaggcaatt tttcagggac ttaacaaata 120
cccacctggt gatgttaaac tacctttgaa gaaagcagct gttggcccaa attgtggcct 180
acaaagaacc ccttggattt taaggataag aaagatttgt atgaggtgga ctgacttctc 240
tcccaggagg cagccatatg gaaggcatgt ggcccagtga caacaataac tgacatttac 300
tgagcgttga caatgaatgc gcgtaagact tacataatct cattatctct ccaatactta 360
ggtgcatgtc taattatcac cattttgc 388

<210> 207
<211> 418
<212> DNA
<213> Homo sapiens

<400> 207
ttagaaatgc ccgntactta agagtanctt gccnnancta caaagctgng ngnttnnaac 60
tnanngtgat ggccattgat ggtttnnntc tcctgancnc aggatntgcc tgcctcagcc 120
tnncnnagtg ctgggattac aggcatgagc caccgcaccc agccaaggat tatttaagga 180
tggactccaa atccagtgac aagtttcctc agaagagtga aagatgtgaa gatagaggca 240
gaaattagac taatgaatct ccaaaccaaa atataccaag gactgccagc agctagtgga 300
gaaacatgga acagattctc cttcagagct tccagaaaca atgaacacta ccaatacctt 360
gatttgagac ttagtcttcc agaattatga aagaataaaa ttactgctgt tctaaacc 418

<210> 208
<211> 450
<212> DNA
<213> Homo sapiens

<400> 208
gaagaactcc cccttggaaa aaccatcagt gccggaagat ttcctattgt gttgatccat 60
ggcaaaggag actgcagata cacaagggat attatggagc ccagacgacc tgaataaaac 120
ccttccctac tacaaggaca gctgtccctt ccctacacac tccctacagg ctgatgagag 180
accttttttg gaagcagaaa cttatacttt atgctgcctt cttcctgact gccaggatta 240
tactcttcct ttccatccca gatctagcaa tgctgttgat gaggctaagt catgatgatt 300
tctttaatat cttggaacac agtagatgcc tgatatttgc tgatggactg gagaaaaact 360
gaaagtataa accacaacat ctcaagagat gtcatgaatg gagaagcata tggtaaaata 420
taatgaaaat taaatctact ttacaagtgg 450

<210> 209
<211> 390
<212> DNA
<213> Homo sapiens

<400> 209
ctgaggaaac tgagacttgg agacttatgt gcaattaccc tcaagcaagt ggtgaactgg 60
attcagtcca tgcagatgtc tggggtggga tactgagatg ctgcgttgct catgagctcc 120
caggtgatga gaaggggcct ggtccatgga ctacacgtgg agcagcagag atgtatcgac 180
ttgtccattg aagagacaca gaccaggaaa ttgatctgct gccaccccag aactgtgtca 240
tttatttatt ctgcccatac gtattgggtg tttctcctgt cccaggcatt gtattgagat 300
acagtagaag actagaagac gagacaggcc tgctccctga cctggtggac tttagaccta 360
aagcaaataa attagactct tacaaagtgc 390

<210> 210
<211> 253
<212> DNA
<213> Homo sapiens

<400> 210
gctctgggtg agtgttccag aagctgacga tgatgcagga tcgtctccct cacacacaca 60
aatgccatgg caacagcaac tccgtgacaa cagcaaagaa agccagactg gaatttgcca 120
acccagagtg tcgaccatct gtgaggccaa accctccaaa tgttgcccgt tctaagtgct 180
catctcaacc aggcttttgt acatagcaga ggcgacattt aagtgacata agaataaaca 240
ttgggcacat gtg 253

<210> 211
<211> 247
<212> DNA
<213> Homo sapiens

<400> 211
gaatgttctc ctgtttgttc agccagatct gggcttagtc ttttgctttt ctacacggat 60
tctaaaatca gcttgagcaa gtccatgaag aagcttcctg gagatgctga caggaattac 120
tctggatttg tggaactgga tagagatggc atctctacag cattgagtct gtgcaccaac 180
ggacatggca tttctctcct ttgattcaga acttcttatc tttcaataaa atttcagaat 240
tttctcc 247

<210> 212
<211> 173
<212> DNA
<213> Homo sapiens

<400> 212
attcccaggt gaagctcatg ctgctgtctt gcagaacaga tttgagtcgt aatgctctag 60
aacagaggtt ctagagtacg aggaatgtac cttctcagct ccaacacaga cctactggtt 120
cagaaactct gtggatggga tccagcaatc cattccttat tgagacctcc agg 173

<210> 213
<211> 382
<212> DNA
<213> Homo sapiens

<400> 213
gatggggagt atgttcccca aagctgcctt ctcaaggagt tggtgccttt tggggagtct 60
tggatgcccc attcgaagac tgtggtgggt gaatcaggcg gtaccccttc gccaagagcc 120
tggggaaatg ggccaggcca gggaggacgg aagaatggct ccatctcaga atgcaagtgc 180
atcctctgcc cgctccagct cctccatgtg ccctgcccag atcctggcac ttctcactgg 240
agaggactcg gcccctgccc agggtcatgc agttatgaag gatgaggcta gaaccctttg 300
cacccatctt tttcaaatta cttcagccaa agtaagcttg gtgaataagt tgcaattaaa 360
ataaaggtga acaagcctgg tg 382

<210> 214
<211> 220
<212> DNA
<213> Homo sapiens

<400> 214
gactcaggct tattgctgtt tatttgtggg accctgctct tttgcttgga aaccaagcaa 60
ccagactctt cactaaacca acaccaacag atgaagttag aaggcttgaa gctcttcctc 120
agccccaggc ctttcttctt cttctttttt ttcccccccag catttgtgga atgtaaagtt 180
gaccagatga accaaaataa atttgtttac ctggcttctt 220

<210> 215
<211> 146
<212> DNA
<213> Homo sapiens

<400> 215
gtcagcatca caagacgcat gaaagaggac tcatcgccag ggcatggagc tggtgttttg 60
atcaaaatgg aatttgctct caaatagaca tgtattcact aatctccttt cttttaaata 120
agtaaataaa acaaacacaa aatctc 146

<210> 216
<211> 268
<212> DNA
<213> Homo sapiens

<400> 216
ctatctgctg cacacgaagg tatacatcaa ttgaaccgcc aacaccctac cccaagaaga 60
gtacctggtg gaagatccaa cagtatctgg gagtaatgga gttttctcgc atggagttca 120
gaagatgaca tttgtttaaa gaagaagagt aaagcaagat aattatcagg gtagaagtgg 180
agttgctact acatggccaa gaaaagtgtg aatgtgctgc agtgattggt tgatcccaag 240
ggcaacacac tcagccagac tgaaaaaa 268

<210> 217
<211> 381
<212> DNA
<213> Homo sapiens

<400> 217
ctcacaattg gatatactgg ttattttacc aaggctttaa ctggaatgat atatttttgg 60
atatgaccag actgctttga gcaatttagg ttgtcttcac agagcaaata aaaagcccct 120
tggaaagact ggcttggtgc ctcatctaca tggctccctt acgaggttcc tgatgatctt 180
gtgggtagtt caatacactg aatggttgta taagtgggaa aagtggcatc ccccttgtcc 240
agtttctata agactaccat tgaataaagg cctcaatcaa ccatccatac ctactgcaga 300
ttcttctaga tgctgatgta tgcggaaccc agaatttcta ttcttggcac ccatataagt 360
aaattttatt tgttctgcat t 381

<210> 218
<211> 298
<212> DNA
<213> Homo sapiens

<400> 218
ggagcccaga gggagccatc caatgcccctt catgaagtca cgcatagtca gccttgtact 60
gattctgcaa aagaggaaaa attaaattat gagaagaaac tggaacttcc caagaatcct 120
aagtgtgtgt ttaacattct gtaacttcca tttcatttgt aaattttctg taacttttcc 180
acttcaatat ttgcttgaat attggtattt aaccaatagc atgttgaact tcaaccattt 240
cttccctaaa cttttatcct ttttatattt ccttgcatga taaattaaaa ataagcag 298

<210> 219
<211> 128
<212> DNA
<213> Homo sapiens

<400> 219
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ggatactaca aagagttcca gtatatcctt cattcatctc tccctaatgg gagagaagga 120
ttattttg 128

<210> 220
<211> 270
<212> DNA
<213> Homo sapiens

<400> 220
gggttacata attagcagaa gggaggagct tcaaatcctg gcactctaac acagagattg 60
ttcacttaag actacacagt accacttatg aaaaaaaact ggcagaaggt gttggtggac 120
aagaacctct cctcttcatg gaagtgaaca gaccccgcga cgtggccatg agaccataga 180
gtacgagatg gaaaagagcc acataccact gtgcaagtgg tagtttgaac tcctgtatgc 240
gtggcttata tacacacact actgagattt 270

<210> 221
<211> 461
<212> DNA
<213> Homo sapiens

<400> 221
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aagtgactga gcccagccag acgtcactgg agacatgcag aagaaaaggc aagattggtt 120
gtgactctcc tcttctggga acattctaga aaggggtagc aaggatgctg aaaccaggcc 180
agctccataa gacctcactt tgcagaaata gagagaagta aggggtgtag gtaggaagaa 240
cagagtggta ctgagaagtc tcaaggaaga gagcgaaggg gaagagcagc atagaaagtg 300
tggctgcatt tgcgtggtgg tcttactgcg tacaatggtt gagctccatg gtccttgtca 360
gcctccctca cagggggaat gccgcagatc tcttgaaaaa aaatagcttc ctntttagcc 420
tgnccсgaaa tccccactat ttncacaaca gggagaatgc c 461

<210> 222
<211> 755
<212> DNA
<213> Homo sapiens

<400> 222
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caccaaagaa gaaatgaaag ctgccagtgt cttctgaagt taaacaggct cctgttcttt 120
gacccagcaa tccaatccta gtgccatgtt tgtggacatc cccccactgc ccttcatcct 180
cagaaaggaa cagcctcctg tgggttgact tggtgatatc tgtccataga taatgtctcc 240
aaccccaggc tcatcactca gacatctgcc ctcaggagga cacgttcatc cccagcacca 300
gagacatgtc tgccaaggct tttggaactg attttatccc catgcaaaaa gctagattct 360
aattctgtct gatcacaaaa ggttgaatca aagccctaca actgaggttc atgcaccaaa 420
acaagaaata catggaaaag ttgccaaagg attttagaat atcagaggct gtaattcatt 480
atagatgtgg atccttttgc tttcctctaa ggaaaaaaaa tattcaattt tattaagaaa 540
aaattcccac taactgnggn catgttcaaa gcactccaga aaatattttg aacgccacan 600
ggtttcgctc aaggaagaaa attcatcatt ttaagggngg ggggaaaagg agctggncat 660
tcattttctc tcaccttatc ctaacantta taagttaaaa angggangga ttggcttttg 720
nctaaactcc atggacaaaa caattttttg ccttt 755

<210> 223
<211> 422
<212> DNA
<213> Homo sapiens

<400> 223
aaaaattgac agcaggggcc atgtctgttt ggtttaatgc tgtaacattc caagcacaca 60
gcaaatgtac ctcacgtgat taattctcat gagtaagcag agatcttgac ctgtagcttc 120
ttacatctgc ctatttgttt agcagaacag agaattacgg taaaacagag gcatggtaca 180
agcgtttgtg tttgctttac aaacacgtct cccaacttag tacaaaaaaa cactgcaaac 240
tcttaatttt agatcttctt angtttgttg taaatagaaa gtagagtata atgntttata 300
gatttatttc taaactatat tatgggtact tttctcgngc ttttcagata tttnagaaat 360
tgggtatgng ctggcatgaa tattggaatc cttttttnnt taaanggtta aggaaaaaat 420
tt 422

<210> 224
<211> 207

<212> DNA
<213> Homo sapiens

<400> 224
agtctgaaat gattccacct ggtcttagca gaaagctggc ccggaagttg taatacatga 60
agatccaaca gccaccacgt gaccaagaga aaaaagccaa aagaatcaca gacctggcct 120
tcacattgta aaggttctta gccagggcca atagttgccg ctctctgaac ttcttatcgt 180
atgagaaaaa taatcattta cttgttc 207

<210> 225
<211> 382
<212> DNA
<213> Homo sapiens

<400> 225
gtttttgcaa tcgcctgtgt gttttctcat tcaagaaact tgagtaattg tttacaaacc 60
agaatgtcct ctgtactgag cagaagaacc ctgcagtcct ttgaccagga aagcaacatg 120
tcaaatataa agagcactgt ctcgagaatt agagagccag gccttggctt ccctctaacc 180
ctactggcca tgtgactttg ggcaagtcac ccttccttcc tgtgcctcag cttcatcttc 240
tgtataatga gaggactgga ctaagtgaat ctcctctaac cgtgacttac acacaaacac 300
acacacacag acacacacag acacaaacca cncaccccaa ccncncacca ccaccttaca 360
cactttgccc atggatcttt at 382

<210> 226
<211> 482
<212> DNA
<213> Homo sapiens

<400> 226
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atctgtaata ttagcatgtt tctagagaaa agatggctca agacaacaaa ggctatacca 120
cctactaccc tgggaatgaa tgcagcagga ggtacttagc tgaggcctcc attgtcctta 180
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gaacaaagac ctccctaatc aaatcagcct ttgcctttcc gggtaaggcc cagcatgtca 360
atcctgctaa aaagcagaaa ggaatcctga agcagaangg ttgtaatatg atganggagg 420
aaccaaagga agaagtgagg aaaagccaaa taatnccttg ggccttggca cttgactcct 480
tt 482

<210> 227
<211> 408
<212> DNA
<213> Homo sapiens

<400> 227
cagttccagt gccttgcggg gaatgtcttc accagtgctc taaaaggcaa caggattttc 60
tgccctgtat ccagcagctt aaggcttttg tttcaaaagg gaataagaga gaaaaatctc 120

tcctatcatg cttttcttgc ggtactgttg cctgttttta actttttgta taaatggaat 180
cattcagtat gtacattttg tatctgtttt ctttcactct acagtatgtt tgaaatgttt 240
ttatgttgct ttgtatatag ttttcttcag atttctgaaa gtatgaccga caaataaaaa 300
ttctatatat ttagggcata ccatgtgatg tatatattta catatatatg gaggcatagg 360
ggaatgatta ccaccatcca gcttaataaa natatccacc acctcccc 408

<210> 228
<211> 399
<212> DNA
<213> Homo sapiens

<400> 228
gtcaagtcac tgaggtgcag agacactgcc tttctgtcct aaagtccagt tcaggccagc 60
tctctccaga gttccaggct tttggtctcc gtctgcagat ctcctttgct ttgaatgagt 120
ctgtccctga ggagggctag gagcaacctt gagaaggaac atgatggtca ctaattcagc 180
cagaacactc tcaaggtgca ttctgagcga ggctgatgcc aggtgcagaa caaacacctc 240
ttgcgcctgg gagcttcctg aagtttggag aatgtgtcag atatcacctg tttgcccctg 300
ggggcctaac cccacccctg tctgcatttc gtgcanacta cactnggggc ttccgttggc 360
cttccgtttg gncagcagga aacttntggc aaaagatca 399

<210> 229
<211> 283
<212> DNA
<213> Homo sapiens

<400> 229
tgaccgctgg aaagggaaca ccttgcaact tctcccacga ggctttcgat cctaatgtaa 60
ggagcagacc tctcccgtca gaagtacatg gtggggaaaa agggccatgt ggacacatgg 120
aaacggattc gggcaggacc agaactattt ccttagccac acagatgaag ggtttgtact 180
aattcctcag tgaggaggaa ctggaacccg atatcaaaat ccactgtatg tcctntatag 240
tttattgtat ataattatgt accataaact gtgcatggct tac 283

<210> 230
<211> 399
<212> DNA
<213> Homo sapiens

<400> 230
gcagtgttgg tctgcaagct tcaagagcca gtgaccctga ctgccaagtg atttgccgaa 60
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aagcagtgac tgccagagga aggcgagaga catatggtgg ccttacagga gaagaacatg 180
tctnagagag ctcctactcc tccagttttg gccccagaat gaaacacagg aagaagacct 240
gaatttgatt tgcatttcaa agtanaactg tcccagctga catgaagact gatnaataag 300
gaataagtat ttattgntgn atgtcactga tattttctgn gggccaatat tntgtanaaa 360
aacctgncct tgggccnctt accattaaac cttgaagaa 399

<210> 231

<211> 60
<212> DNA
<213> Homo sapiens

<400> 231
gtggatgaag ttgggtgctt cctgtacatt gattttgctt ccttctggct caccaagaaa 60

<210> 232
<211> 321
<212> DNA
<213> Homo sapiens

<400> 232
gcagcgacct tcggcattaa attactcccg agaactcccg agcaaagcaa caaaaccatc 60
aaatatggct gagccgataa tgcgccattg tggtccagcc tgggcaataa gagcgaaact 120
ccgtctcaaa taaataaata aataaatagg aacagtgatc actaattaca aaattgaata 180
tcgaacccaa aaggcatatg tgtccaccgg aagaatcttt ctgaatatat caggtttgat 240
tccatgtaat cccacaccag cccaactacc cacatccaga cccacatcca gaacgttata 300
atctgataag tgcgacaaaa c 321

<210> 233
<211> 240
<212> DNA
<213> Homo sapiens

<400> 233
aagcacctga gactgcagag agtgccatgc aacaggaaga tcagtcaacc acagagcacc 60
aactatcact tgcccggaaa acatctaccc tcaacactgc ccagggaaca tctaccttct 120
tctggtcaac catttacaat ctcttccaac ctccaacctc catacсctct ccttaccccc 180
ttctctcaat atagcctcac cccttgtatg tcatgaagga aataaacccc cttatacaag 240

<210> 234
<211> 600
<212> DNA
<213> Homo sapiens

<400> 234
gcagcacctt acaagaaaag ccagaaaaga aaacccgtgt gtattgtaag agtttaaaga 60
gacagccact ccaaaagaaa atggacattc acattgacgc ctggaaaaga accaggagtc 120
accatgcaaa tgtgtcatag cagcgagaag tcctgtgaaa gcgaaggaga tcagccaggc 180
tcccgtgagt cacggttcag gattcagatc ttcatcttcc taagacactg atctcactgg 240
tcccagttat tcctgaaacg ctgtccctcc tccgttttcc ctgaaattta tcaattaaag 300
taccggntct tgtgtaaggt aaaaagatta agaagtttga tgagacagag tttacaacag 360
ctaaaaaaga agcttaatgg gatgggagtg gttcacagat ggtgcaaatt gtctgctaag 420
tggcacttta tggatgggca gaatccatga gagttttatc ttgaatttct atcaggctgn 480
attcagcana aactgggtcc ctggaaattg gcattttaaa aaaaatctct gncgggggnc 540
tatctttcct gggtatacca atggcagntt cgacccattc nagctgggtt cttgaacaag 600

<210> 235
<211> 202
<212> DNA
<213> Homo sapiens

<400> 235
gggaaatttg gacacagaga cagacatgcg cacaggaaga atgtcacgtg aagatgaaag 60
cagacatcag ggggatgctg gctgcttaca agccatggaa tgccgaagat agtgagccga 120
caccaggagc taggagagaa gcctagaact gacgctccct cacggcctca aaggatccaa 180
atctgctgac accttgattt tg 202

<210> 236
<211> 427
<212> DNA
<213> Homo sapiens

<400> 236
cacatgctta cccagaccct gatacgatcc tggaccaggc agaagcagcg tccttctcct 60
ggaggagctt ggagcagcag caggaggcag gcattacacc ccgataagca tgcagagttc 120
tgaagaggaa gctcgcagcc tcactcactc caggcttttc ctctggacct gagctctgat 180
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caggatctct ggggtaatta ggcccgcctt gcccacaggt gctccacagg tggtctcagc 300
tcccagcaat gacccaggga gaagcccacg ggaaccctca gctgcaacca atcctccaga 360
ctgctggcct gcctgccttc ctgaaatagt ccagatttca cttattaaac atattaatct 420
gaaagtt 427

<210> 237
<211> 248
<212> DNA
<213> Homo sapiens

<400> 237
gtcagagaga canggaacca ggaggccacg actggaaagt ccaggcagaa gagaactgtg 60
gagccagccc agggaaggac agaagtggaa aagtcaccac agacaggaac aagcttcctg 120
gcacacgact tncctgccaa acaactcaac tgtagtcaaa aggaaagaga tttgtctagt 180
cctataccag gacaaggagg agattccaag gtgctccaaa ctttactgat tgtgcccttg 240
ttcagtta 248

<210> 238
<211> 401
<212> DNA
<213> Homo sapiens

<400> 238
gtgtgaactt gtatcccagg ctggccagtt aggatcttcc attccatccc caccaccatg 60
actggttcag gaacagggaa tgagattcga tcctgaaacc cacattgaca ctactgggaa 120
agataaattc ccctccccac caccccattga agagactaat ctggagctgc cagtggccac 180

catgtggaaa aagcccacac aagaatgaca ccaacacaga gggagagcca gcctgagagg 240
gagggagaag aagaagaaga gacccgatgg catcttttca gctccgggac ccaggtgtac 300
tccacccact cgactttctg gatagaaaag ccaataaaca ccctctaatg ctcatgccag 360
ttggactgtt tttcaattaa aataatccta acacaccctt t 401

<210> 239
<211> 490
<212> DNA
<213> Homo sapiens

<400> 239
acggagtctc actatgttgc ccaggctggc cttgaactcc tgggctcaag cgattgatcc 60
acctctgcct cctgagtagc tgaaactaca ggtaatctgc atctcattaa ttggaccata 120
agaccaagca gccagacctc agttttatcc gggtacaaaa tctggcagct ccactgggac 180
agagctgccc tcagcagcta gaggcttgtg acctgacggt ctttaggaga ctcccagcag 240
ctgctaggta cagtttgtcc tgaggacgct tctgagaact ttccctgggc aaaaggacca 300
cccatcccct tgctactggg gtagaanagg ggctaggaca ctgaaggggt gagtaaaact 360
ggatcataag cagggagtct attgcttcct tatcaggggc tttgcaaagc cattcntttt 420
tggtanccct ttaaggagac aannngggct ttntttgann ttttcncttn gcatatngct 480
tggaaaaata 490

<210> 240
<211> 330
<212> DNA
<213> Homo sapiens

<400> 240
ggagcaagcc tgtcaaccan nagcatacga aaccggagtt cttgccttat cagcccttct 60
gcatgggaaa gctgcctcag cacggctctg tctgtgaatg cctaactctt cccaattctg 120
aggtcagaac cagcancccc attggctaag agaactgaag ctatatcctc caacttagct 180
tatccggtta aaagataaaa ggatgatatt ttgantnctg taannaaaan gncggaatag 240
gccttgaagg ctcnanttga nccgggncca aanagctnga annggggggan ctgnnagagn 300
ancaccatga gacggggaaa gggggatgga 330

<210> 241
<211> 139
<212> DNA
<213> Homo sapiens

<400> 241
aattgaaagt gaagaccgat gaatcatgcc ttctgatcaa gacccatgtt ggagattgtt 60
gccctgacct tgggaaagtc tgtgtccatg taaattcaga tcttaatgaa acaaaaataa 120
atgtaaagca ttttctggg 139

<210> 242
<211> 457
<212> DNA

<213> Homo sapiens

<400> 242
ctgaggccaa agccccctcc ccagagcaga cccctagcac tccacagcag gatcacaagc 60
tggtctctgg tcccagaccc tgcggatcct tgtcgacgct tccagtctcg atcacttccc 120
gatggtttga atgtgaagtc aacaatccac ggaacaattt gcacttactg tttctagggc 180
ttttgcagtt aaaagtgtct tcagtttccc cgatcttcct gcaggtgccc ctgcagtcag 240
aagctgagtc tgtcccttct cccagcagca gctgggtaca ggatctaaca tcagtctctg 300
cctgctggcc agaagccaca gctgcaacgt gctttcaaga aaaatgggcc aggcccaaag 360
gagctccccg tcaagtgctt ttcagtgttc ccagcacaaa gataaaatta cacttccata 420
ggagtacaca aactaaaaat aaaatttaaa gaaagcg 457

<210> 243
<211> 420
<212> DNA
<213> Homo sapiens

<400> 243
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tttgtgactc atgaagctgg ccttcacgga ctgccccaac cagcctctcc agctctctgg 120
tttccaggta tcctctggaa tacctggaaa tatacaatag gaaacaccat catgagatag 180
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acagatattg agacagagtt gcatgcagaa gatttattgc ggagcacgct tgggggatac 300
acctataagg aacttgatga angcaaaatg gacacagaga gaggctgact cgtgatacag 360
ctgcatccag gacatcagct gatcttatat ggagatagaa taaaccttca cagttgtctc 420

<210> 244
<211> 463
<212> DNA
<213> Homo sapiens

<400> 244
gtgcttcttg actgggaagg agtggaagag gtcctaggtg cagaagggta tggaagataa 60
ggtcaaagga tgtgctggtg ggaatgggag acaactgaga aggtgagaca agctggagga 120
aatgtcagga gctgctgaga gaagctcagc ctgaccagag atgagaattg ccatcttgaa 180
tcgtcaggaa gtgaaggaaa gcccaggtga atgccaccca atcaaaaaga aaaaacaaat 240
gcagatggta aggtagagaa ggctctgaag cccaggtaat gagagccatg ttaccctgga 300
cagaagcatc caacaccaca catctccaag gatgttggag atccagcatc tggatccagc 360
taacttctgc atcctcttct gtcttcaaaa agtaacattg gccgtccttg cntttgntgg 420
acaacacccc ctaaaacgag tgtntttgta cgttttcaca cac 463

<210> 245
<211> 317
<212> DNA
<213> Homo sapiens

<400> 245

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gatctcaagg taattagtct acagcccagc cactgctgag atgacaccag cacacgctcc 120
aggtggacca tgactcaaga cggccaccag aacaaggcat accgacctta cactcagcac 180
catgcccgca tgcctccctc tccaagttcc tcttttaagc ccctctcccc agcctaaagt 240
ttgaaatgtt tcttgtaagg aatgagcctg gccatttccc caaccgctgg cttttggaat 300
aaagtcactt tccttt 317

<210> 246
<211> 320
<212> DNA
<213> Homo sapiens

<400> 246
gctcctgtga tcagctgagt gctcgttaat tcccacgttc actaaaccat catagttctg 60
ctgattctca gctttagagg gaaactctac agtgaacttt ttcaattagc agtcatcaat 120
tactggtcag aatacattat aattgtgaaa attatgctcc attaatctca ttaaatgtgc 180
ctaaacctgt aacttgtcat agttcgatac ataggttggc tatatttaac tttccctgat 240
cttatttgcc attttttgca aaagcatcat ctaaaatgta gagagagttg tcagtaattt 300
tggcttttta ataaacattg 320

<210> 247
<211> 218
<212> DNA
<213> Homo sapiens

<400> 247
gtctcacaga actctcttct cttcagaatc catcatcttc cctgactaag aattcactgt 60
atggagagca ctaggagttg taagagctcc aagcctaaca taagagacat tcatccagct 120
tttagatacc acaatctatt catctgtgcc tacttacagc caaatatcag aattacatgg 180
aaatgttagg ctcagaacca taaagactgt cagaagag 218

<210> 248
<211> 546
<212> DNA
<213> Homo sapiens

<400> 248
ataatgaaat aaagctcaaa gaggctcagt ttccaagatt acacaaccag aaatgacaga 60
agatgggtcc ctctgggatt cacgctcctc tgctgggagt ttcacaccat tcgccatgtc 120
aacatgaagc aacagctggg ttgaagagag ccgataaaaa tagcagcatc gcactgcaag 180
caagccgcat agaaaagaag gggagtcacc gtacttaatg cagggtggca ttgatttctt 240
gtcttcccag tccagtggtg tatttctcgg accatctact ttttcagaaa gagcaaagtg 300
agctgcttgt ccatatgagg aaagagacgc taagagaaat tgaggaactt tgctgacctg 360
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ttcacatgag tttgcatttg tcatctgaac cttctggatt tctatcatgt cacttgctgc 480
ggtctcttgn atttgtggga attaaaatta aattggggag gtttttattg acttcttttc 540
tttgag 546

<210> 249
<211> 427
<212> DNA
<213> Homo sapiens

<400> 249
agagacagag tcaagcatct gctagcgtcc ttggacaaga atgcatgtgt ggacacagag 60
acaccagacg ccaatacctg gaggaaaact cacagcctct gaccagaagt gaactagcaa 120
caatggtaca gttaaaggat ccgccttgcc actcggctcc ttataccaaa agccaaacct 180
cttttgctaa agcagagact gttacatctc agcctcaagc tggcaaatcc tgctttggat 240
cccggcagag gaaattcagc cgttcattag ccttaacaag ctgctgtcac taagcgaaga 300
aattacacga gcagncacac acccggggct tttaanagcc ntccccccaa gggcaagcgg 360
gtttctccag gacggactgt acaagttcac acttcctatg tgcaaatccg gactgtcttc 420
ttgggct 427

<210> 250
<211> 530
<212> DNA
<213> Homo sapiens

<400> 250
aacatgagct caggagggct gggatttggc ctgccttgtt ccctgcagta ctgccagaac 60
tagcattgca cctggaacat ggaagggccc aggacacagt ggccgtggga caagagcatg 120
aagccccaga gcctcaagca cagatgtacc tctcctgggg cagggggttt cactctgccc 180
cacagcggga ggctacagcc tggccatcct ggggaaaccc aaagggaaca catggacaga 240
tcagcatcca ctntnaaaag tgccaatgac ttcaagctgg aatccaccca caggctggtc 300
gnccctggct ggccaggaaa aggctttatn accatgccac aaaagctttc aangggcttt 360
tttgganttt naancccccct ggcctaaggt ttgaaaaagg canggccccc cccaaagncc 420
ttttttttg gggggatttt ttaccctatc nnattttaaa cttcaaanaa aaattttttaa 480
gccttncccn gggaattcat ctttaaanna tttgggtcgg tttttttaac 530

<210> 251
<211> 279
<212> DNA
<213> Homo sapiens

<400> 251
cacccataaa attcaatgga ccaccatccg gacaaaagga taaaaacaga acacatcaag 60
ataatgaatt ttcttcaaac tactgaggta caatgaaaaa tggaaatatt atctcagaaa 120
ttacaacaga gggatgaaga tatagcatat gctgtaccta aaagatacat caaatgggac 180
attgggaata tggattgatg aaatttaatt tgcgattgnc ctataatgcc ttttcattaç 240
agtaccacac aaattgaggc aataaatgta tatttgatc 279

<210> 252
<211> 296
<212> DNA
<213> Homo sapiens

<400> 252
gatgagaacc tggctgttta aaaacatgga atcagtggag tcctgaatag cagcacatga 60
cttgcaacaa ctttcaacat ctcataaaat ggctgctcag cattcacttt ccatctcaga 120
gtcacttctt tggaactgct agggagtcca gggtacattt gagtcctggc agctcatgtc 180
ctgctctgtg gcagctcttc ccactgctca taggagtccc atacccactt ctcaaccatg 240
tccggctgag cattacaaat caccttctgt ttaaaataaa ataaaataaa aatctg 296

<210> 253
<211> 548
<212> DNA
<213> Homo sapiens

<400> 253
gatgaagaaa acgcagatca ctctaagaat gacaggtttc ctgggtgctg tgaagcatac 60
ctaaacagat agctgcaaag aaggatcttt tctctatttc aagacatgaa cactgcccca 120
tccccactcc tggtattttg taccctaaac aaaattgggt atttgcctga tataacctga 180
aaaaggtggt gcattatact ttacatagtg atttatagtt tacaggctgc ttttacgatg 240
gtctcattta gttttccaaa atcaagctgn gatataagtg ctattattcc cctttttaaa 300
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gcagcagaac caggactaga attgcaagcc cagtgttctt ganggttgag ccccaagaaa 420
ctctgtccag ggctttgcat catggggatt tggcccaccc nccntaagca ncggagggat 480
ggantgcaaa aacactggcc tttttctttt gtcccaancc tgcctnttgg gaagtccagg 540
accaaaaa 548

<210> 254
<211> 219
<212> DNA
<213> Homo sapiens

<400> 254
caggtaaaca accaccacag atgcaggaat ctgacagatt atgaatctgc tgctaatact 60
gctgacttca gtcccaggct actctgccat gatacagaaa tatgccaagt ctgctccagg 120
aagctgctga atcaggaatc cacctaccac attgggcagt cactgctagc tgccacctcg 180
gccttgatcc tcgccagcaa aatatatgcc tcaaacttg 219

<210> 255
<211> 374
<212> DNA
<213> Homo sapiens

<400> 255
atggggattt cggatgttgg aatcatgagg cttttgttta agagttgctt aagatgttct 60
tcagatcctg aattccagca gaacagctga catccacaac cagtttgagg atccccacag 120
aagagctgaa tcaacatgag aatgcagttt cttcatctct ccagtccatg acttcaccct 180
gcaatcccca cagaagagct gaatcaacat gagaatgcag tttcttcatc tctccagtcc 240
atgacttcac cctgcaatcc ccacacctca gcccactcca aaccccttac aaactcctca 300
gggaggcaaa tctgaggttt ccttccatct ccttgttcag atgccctatg attattaaac 360

cctttctctg ctgc 374

<210> 256
<211> 199
<212> DNA
<213> Homo sapiens

<400> 256
gtcatgcgtt taaaaagaag agggcattct ctgcctgcct gctgcttgga cagtgaactt 60
gactgttggc catctcagac tgcaaatgag ggcaatacta tacgaggacc aaatgacaat 120
gaaggaatcg ggatccctgg atgacttcat ggaacaaagt catcgtatct ttcctggaat 180
gccagcttcc aatgggtgc 199

<210> 257
<211> 463
<212> DNA
<213> Homo sapiens

<400> 257
gaaggtcaag ttnnaagccc cgatggattt gatgcagccc ttgttgcttg nangatggga 60
gggggttcat gttgcaagga cgtgggtgat ctcccagcta acaccagcaa ggaaaccagg 120
actgcagtct cacaaccaaa aagaattgaa ttctgccaac aacaagaatg agcttggaag 180
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aacaggagga gctcanataa gcttctccca ccaccacaag ctgcatttaa agtggatagc 420
atcagcttca ggtagaaatn caaggaangt gtgttttgtc aac 463

<210> 258
<211> 34
<212> DNA
<213> Homo sapiens

<400> 258
tgagccgaga ttgtgccact gcactccagc ctgg 34

<210> 259
<211> 149
<212> DNA
<213> Homo sapiens

<400> 259
actaangaaa anctntatga ggatacancn agagggcagc caactacatt cctggaagac 60
anccctgaaa ccaacactga tggcacctag atcttaactt ctggcatntg gaactgtgaa 120
aaaataaatt nccattgttt aagccatgc 149

<210> 260

<211> 440
<212> DNA
<213> Homo sapiens

<400> 260
ggaggaaaaa aatgagcaga aactgctaac atctggaggc tgctgtccag tttacgtaat 60
ctcttgctgc agaggaggaa cacgggatcc ccagccagat ggtccgtggg tgacttcaca 120
gcacatgtgc tacctccaag acagggttct ctgaggaaca aggaccttcc agagtgatgc 180
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aacccctgca cctgccactt tccttgatct ttccactaag caccagaaga cacatgcntt 360
ttaaatcaaa ggaatgtgag ttggaatttc agcttctgcc attcactgac aacatggcct 420
tgaacccttc ataaactcta 440

<210> 261
<211> 253
<212> DNA
<213> Homo sapiens

<400> 261
caganactga ggacctcact ctgtcaccca ggctggagtg cagtgggtgc aatcttggat 60
cactgccacc tctgcctcca ggctaaagtg atcttcccac cttancctta caagggagca 120
gggantacag gaatctggca tcttccttta actttcaggg aaccatgggg ggaaactacc 180
catnggcttt ggtaaagcca ccaagttggc attccttttt aaataaaaaa ccttggttaa 240
aaccaaaacc ttt 253

<210> 262
<211> 451
<212> DNA
<213> Homo sapiens

<400> 262
ggagtggaag aaagcagaca agatggggat tgcccagctc tgtgaacgtg ttggatgggt 60
gcgtctatcc cgagtacaac agaatctgaa ctcagggcag tgtgatgtac tccagaatct 120
accttctgat ggtcatgggc tcaggatggg ccttggagga gatctgcaca ggaagcacaa 180
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tcaccaggtc agcattaagg gaaggcttgg ctgcatcatc tgccactctg ctgctgctga 360
ctctgccagt ggggacagca catgcttcct tctacgcttg cctgaggntc gtaacttcaa 420
aaccccacaa cnntttttgg aaggagtaaa a 451

<210> 263
<211> 210
<212> DNA
<213> Homo sapiens

<400> 263

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aaggatcctg tggcaggcaa atggaggaca tcaggagata aggcaaggtc cctgccatca 120
aggacctgac agccggctat gtgattctgg gcaagtcact aagcttgttt ttacaactgc 180
aaattgagat aataaaatta tctcccttgg 210

<210> 264
<211> 324
<212> DNA
<213> Homo sapiens

<400> 264
ggtgagacaa cgataagtaa gcaaccacga cacaggaaga gacttgtcgg ggagtggaag 60
tgctcccagg agcatcaact tcgcctgtgg gctgggaaag tgtgcactgt cccagacaga 120
cagaccagga tctggtgatg ttcccaggag ccaggcacga aggatcaaac agtgaaactt 180
aagagtttga gcggccttgc ctcctggatc ttgtctttgc ctttagaatt gtaattatag 240
gatgtgtgtg attttttcc cacttaacat gtcgtgaata ttttccatgt ctatgtaatc 300
ctttaaaagc tatttacaat gatt 324

<210> 265
<211> 82
<212> DNA
<213> Homo sapiens

<400> 265
acgggagtct nactatgntg nccagcctgg ncccgaaccc ctgnccttag gantnttaaa 60
angnaaatag ccccaatcat tt 82

<210> 266
<211> 245
<212> DNA
<213> Homo sapiens

<400> 266
aaaacctggc ccatacagag cttacaccta tgaccttggc ttcgtgggca ccatgatctc 60
agcaatgcat ctatcatgcc tgcctttgga cctaatgagt atgaaccaca ttacatcaga 120
gaagagtgcc agggtcaaca attaatattt tagagttaca actacatgtg aacctatgta 180
cttgcatttt cagcaatatt gcagcatagt attatttatc tctaaaataa aaaatgcatg 240
aatat 245

<210> 267
<211> 455
<212> DNA
<213> Homo sapiens

<400> 267
ntgctattgn ctnaatcgnn ggaaaatncn ngganngaag cgctagnnna ccttctcngn 60
ccnntnccaa caagcccggg cctncntctg ntgncatgan acctcgaggt ngcaaggaaa 120

tgctaatgga ttccgagggg catgctactt acctacatgg aattggcttc nnaattcact 180
gggcaacnta ctgagactac cgtnnaggct atttaatcat cttcactatg aanngccaat 240
tctttanagt nttatgacat tcatgaatga ngcggggggc ggncatgatg aatgcagagc 300
aattccctgc gacagatact ttcagggaat ttatgccccc tcccccaaga acaaaagggc 360
tcctgggctc agttatcatt tgntctgcga gagaaattac agtcttttca gcaactncnt 420
ttaccctact caataaaaag cgcttatttt tgaaa 455

<210> 268
<211> 182
<212> DNA
<213> Homo sapiens

<400> 268
agtgaagaga tttctgactt cctgtcctct tccctgctat attacataca tctgcttaaa 60
ctctggaaaa cagtaccagt caaagtggtg ctgaaacctt cctctaagac aaactaaaac 120
gatgttaaaa aggttacacg accttactat ttcaagtact ggtataaaac cactttctct 180
gc 182

<210> 269
<211> 502
<212> DNA
<213> Homo sapiens

<400> 269
gcagactcaa cttcttagag ttccagcaca ttgagccctg tttgtctcat ccatcttttc 60
actgaccttc caaaggtgga ctggatggag aacccccagct gtccattgtg tttgaaatcc 120
ctttaagtag ggactcggct agaggtgttc ttctgcctga tccccagatg aaaaggacgg 180
gaggggagtg acagaggagt cttcagccag ctgccatatc cccatgccgg accatggaac 240
ctgacttcca gcgcactgta gcagagaggt agctagagag cagaaagtag agatttggct 300
ctcctaggga tcttggagag aactttgtta tttcagcttt tgagatatct tctcttcctt 360
cataaggatg agacccaggg tttcctgata gggcactgcc ctttaaaatg gactttggga 420
ataatttggc ccactgggtt tttttgaaaa agaataaagg ttggggggtg ggaacctaaa 480
gccctacccc ctgggggaat tg 502

<210> 270
<211> 186
<212> DNA
<213> Homo sapiens

<400> 270
aaaatgagca acttgaaagc agaaactata atcactgtga attttcccat tgacctgcct 60
tgcctcttgc caatttttat gaatttttct atttccctca aaaccttgta aaaggactct 120
tcacacagca gaattacaac gacttgtctg ttcaatgaat aaatcagctc atctttatct 180
tctaag 186

<210> 271
<211> 386

<212> DNA
<213> Homo sapiens

<400> 271
gcattatcaa ctgatgtccc acaatggagg atgaagattt actttctctc tcatcaataa 60
aaatgtcgga taatttttgt gggtacgcaa ttccaggttg aaaattaaag gcaatattcc 120
actgtattct ggtttccaat gtcggtgtga agaaatccaa agccactgat acagatataa 180
gaaaaagatt tgagtctttc tacatcaagc agaacatcct tggaatttct agcctggatt 240
tccaatgcca acagaatgtt cagaaggcat tcaggccagt gaagttacca acacaacaaa 300
gatgaacgct tttcaaaaaa gaattgcatt atttgctaat aactgatact tagcagcaaa 360
ataaaaacca taaaataaag aggctg 386

<210> 272
<211> 482
<212> DNA
<213> Homo sapiens

<400> 272
atctataaac taagaataat ctggagaggt caattcctaa ttagaaccta gtatggaaga 60
ctaggatcct aaaactcagt ggtaactccg aagagtaaaa atctacccca gagctatacg 120
tgaaagattg gaattttaca gggaggtttg cattttaaaa ctggttgctg agatttcacc 180
agaactacca cagaaacata ccaggaaagc tgagagaatc cacagatcct ttgaaggaag 240
tggcttgctg ttgcaggctc cttgagacag ccaaaaactg acctccagta caattttcag 300
gagaagtggc aagaatggac atccacctcc caccatgtga tgacatggaa tttttggcca 360
ggtacggtgg ttcaaaccta taatcccaac actttgggag gctgaggcag gaaaactgnt 420
tgagcccnan aagtttgaaa acagcctggg aaacatgcaa aacattaaaa cttgagatcc 480
aa 482

<210> 273
<211> 479
<212> DNA
<213> Homo sapiens

<400> 273
gccaatccta acccagatca aagatcctgg gacagctgga acaggcatgg cctaatggaa 60
ctccccaagtg gacagggcca agcatggacg gacagagctt ctgaaacagt cctcagaccc 120
cgtgcatctg gatctttctg taggaaccac ccatcagcag tgccagacag aaccaagcac 180
atgcactgat ccaccgcacg atgggagctg gtgtgggtga gcttgtttgc tttagccatg 240
cccacagaca ggaacagaag agcacagtgg aggccaccag ccctctcgcc tgctatttca 300
aaaggggttg cagcagggct ggaaagcggt tcccactgtg gttgccccct tcctctctgc 360
ggcacacaca gacctgaaaa taaccagaga gggactgtga gctgccagcc taaaacaagg 420
aagnttgcan aaagtcctag gctcagatag gagagtttaa aagaatgttg aaaccgaga 479

<210> 274
<211> 490
<212> DNA
<213> Homo sapiens

<400> 274
cccccgttgc cactgaaggc tgcatttgag agatgcccaa ctgactgaga cgagaacaga 60
ggtgctaccc tggaacctgg ccacaaggaa gccctgatgt gtttacagtg tgagcttgcc 120
cacaacttca aattcatcac catcatgctc taacatcgaa gtcctcacgt gcctcacata 180
aggaagcaca atttaaacgt cataatagcc aatgatcatt aatgtttact gagctctttt 240
aaagcagaag gaactatggt aattgcttcc catgcactac acactagtta atcctcacag 300
ccaccacccc tcatgttaga tactattatc attcctattt catacacgaa gaagctgagc 360
ttcagaagtg gttaagtaac ttgctagaga ccaaactgta aggagtaaaa ctgaagccta 420
tgggcctatg actcctaagt caagactcag agccactctg cttatgtctc tcataaaata 480
tatttcatgg 490

<210> 275
<211> 344
<212> DNA
<213> Homo sapiens

<400> 275
gacaagccac gccaaggcca aagctgaggc agcggaacag gccgccctgg ctgccaacca 60
ggagtccaac attgctcgca ctttggccag ggagctggct ccggacttct accagccagg 120
tccggaatat cagaagccca tggaagccca gggagatgtc cctggggcag acactaaggc 180
aggtgttgaa gacaagctgc ttgtcaagaa gcatttcccg gcaagagagg ggcaagtctg 240
gggctccaac tgggtacagc ctgggtgcag ttataagccc ctttggctta cttggtagaa 300
gatggctact tggatgtacc tcacttaaag atgttttgta ccac 344

<210> 276
<211> 29
<212> DNA
<213> Homo sapiens

<400> 276
ggctgancac agtgagtcac gcctgtaat 29

<210> 277
<211> 470
<212> DNA
<213> Homo sapiens

<400> 277
gagaaatacc atattatccc cattttgcag atgaggagac agaagtggag agaggtgaag 60
tgacttgctc aacatcacac agttgccttc ccacgtgtgt gagaccattg ctgtggaaag 120
aagccgggcc tgacttcagg gatctggtgt gaaatgactg gacccatgcg ttctgagtaa 180
acaagagagc cccttctggc ttctccggga ggaaccaaat ggcttcagca ttcagctcca 240
aagcccgatg gagaccaaga gtgatacact gtactcatga tcaactgctc agttctggtt 300
tgggcctctg agggctgatg gggtttggca gaacctccag cacaatgttg aatggaaatg 360
gtgatagtgg gcatcttgtc ttgtacccag tctcactatg tggaagcttc actatttcac 420
aatgaaggcc cagaccggng actcaaacct gtaatcccag cacttttgga 470

<210> 278
<211> 504
<212> DNA
<213> Homo sapiens

<400> 278
atgtgttggc tggagctgaa gcagacatat tggaccatgt ggtgacaacg agaattgagg 60
ccaccatggc aggacaaggt gctgcagtga ataccacaga caactatagt ttcaaaggtt 120
ttctaccagc aaaagacaag aatttttgaa gacactggga tataagaatc cagcaaaacc 180
tgttgcttgg gcttttaatt ttacgtctgg tctccaatgg ccttgtatcc aaccattggc 240
ttaggaagaa ttcttgtgac ctgatgccaa atctaaagtt tgttgtacag gagcagccca 300
gatttggtgt gttcctctac acaaggaaca attgcctgga gacatgattc acagggagga 360
gggagtgcct tcctagaaga gctatcataa aaagggtaca caagtagatg ctcaatcagt 420
gctgactgga atgaaaagaa ccaaagggat gaaaagaagg aatngaagnt ttgcaaaaga 480
tgaagctcta natccttgcg acag 504

<210> 279
<211> 509
<212> DNA
<213> Homo sapiens

<400> 279
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acttctgcta tctgagggca tgtgttttca tcttcaaaaa aggatggaca gtccccatga 120
accttccctc tccaaccaca caggccttgc ttctggacat gcagtgataa ctctctgttt 180
gctggatgaa gatcatgttg gctctatgca cattcagata accttctaca ccagacaccc 240
ctggtgattg ctctataaat catattggcc aggagaaagg atgttcagtt ccctaggctt 300
ttcatcatgg tcaattaggg aatcagccca aaaggtcagc atcactgccc ttaaatgang 360
tcacactcca tgcactctga gtaccccgga aaagctgtgg ngctggtgat taatgcatgt 420
gtccagaccc tgggtttcaa cgaaggcaaa tccctggcat acaatnccaa cttggctctt 480
cttactgggg gggattcttc gagctgggc 509

<210> 280
<211> 490
<212> DNA
<213> Homo sapiens

<400> 280
gtggcangta aataaggata agagatgata gtcaggcacg taggttggaa ccaagctgca 60
cacaccgcac agtggagaga gacctgatcc tgcttagggc agagtggggg aaaggagcca 120
gggcctcctc ctgctctgat ccccaccagc tcatgacctt ggaccagccc ntgacctcgc 180
aacctcgcag aactgaaaaa ctctatgntn tgnacgnacg atnangagng anctttgnaa 240
attggtnctt aaacttggaa gtgcaacaga agactggaga cttcacatag accattgggc 300
ccttcgccca gagtttctga tttagcaggt ctgaggtagg acctgagaat ttgcattttt 360
tgttaangnn tccaaaanga nctnganmnn ttttcntttt gggaanaaca cttttaaaaa 420
actactgttt caaaaacaaa aantttggtg gttttaaaag gatgnggaac aaganaactt 480
tttccaaaag 490

<210> 281
<211> 520
<212> DNA
<213> Homo sapiens

<400> 281
gttcagccan ncantggccc tgngangaca ngnnaagncn ccngnctcgn nctgggccct 60
aatgaaagga ctcaagngan gccaccccctg ttagcgcgct gagaacatgg cttggtgtgc 120
tcctctaact tggganagaa tagggctgtc tgntgtctnt accgcanagg gctnacatnc 180
nctttacggg atccgnntcn gagganmngg gccatttctc ttcccttatc tgtttatgat 240
gcgatatgtt ccaaagccga tcacatcagc cgctgttatg gtgaacggaa ttcactgtga 300
tggcggctgc accagcagag ccgcgtgggc ttcatgccac gttacgcgga gtctangacg 360
gcctcacccc gctggctcgg gctccctctc actggggtac acatttatcg ggatttatgc 420
tttaaaacaa gtagttcaca tttttttaa tgggggaaag tacaanaact ttccattttg 480
gcggngngac ctancaatgg gcttaacttt tgttttttgt 520

<210> 282
<211> 386
<212> DNA
<213> Homo sapiens

<400> 282
gagcaggaag ctgcgtggta atcccgcctg caaaagctgg aagagagggg cggaacgaaa 60
gaaccaatca tgagccagag acaaagaaca gagtaaccaa tccttgggtt gaaaatgaag 120
tgggatggaa cctgggccaa atagacactt gaaaaaacaa atggaaaaaa aaggttgatg 180
taagtcccac cctttagatc tcctatagga caggattgtg gagaatttgc tgtcatatcg 240
ggacaacctc ttcaaggggc ggggcttagg gaaggggtgg ggtcttaaag tgggcgggac 300
ctagacgaag aaggcggagt ccaaatcatc actggtccac tgatccgaga tgtccaatat 360
cccacttaag atgtaaagtg tggggt 386

<210> 283
<211> 489
<212> DNA
<213> Homo sapiens

<400> 283
caataactat ccaccttcga caccttgtgg accatgaaaa cctcaaggat agagcaaggg 60
ttattcatcg ctgtatcgct ggtatccagc tccatgcctg gcccagatga gcagctgaga 120
ctcaagatat tgtttaactt gcgcatgttt gcataggtag taacagtgaa gatgggtctg 180
gagcccagcg atctaattac tactcagaaa cacctgtgta tgcatcgtgc tctcaattct 240
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agctcagctt cctcatgggc ttgtatttaa gcgcctgcct gtcacaccaa cttactacag 360
ctaaatgatg atgcaaattc tccaggnttg catcaaccnc atgaaaaanc cnccaccttt 420
acttaanttt ttttttaa aaaaagaaaa aaacaggang gagcttgttg ctcaactgac 480
ctaagcttt 489

<210> 284

<211> 181
<212> DNA
<213> Homo sapiens

<400> 284
aatctttgag tccacgtgga ggaaggaagg agaagaggag aagactgttt tccaggatgg 60
aaagggagcc tcgctttctc tttaggtgga ttacagaaat tggttgaatt ctccctgccc 120
tggagaaaag tcaatttatt ttttatgtta aagatttagg ctcttcctga gggctactat 180
g 181

<210> 285
<211> 319
<212> DNA
<213> Homo sapiens

<400> 285
agaaaccaat cggacacatg gccgtggcag ttaattctat aggctcccca cctggataac 60
acccaagctc aatgcagccc cacccaaagc caataccttt tctccaacct gccccttctc 120
ccaggaaagg gcagcctgtc ttctttggta ccccatcatc cacccaatta cccagagtag 180
aaaattcagt attatccccc tatctaagca gtcgcccagt ctggctgcat ctactttctc 240
aatctgtttc ttttttgtcc tcctgtagta tcttaaaaac ataaagggaa aaagatataa 300
atgccaagca aaggacttg 319

<210> 286
<211> 230
<212> DNA
<213> Homo sapiens

<400> 286
cagaaaatgg ctcctcaatt ttctatctca tgtggaggca acatttctgc atcagattca 60
gcctgtgggc aaaggaatga ggcttcttct acgatccttc aggctggccc ttcctgaagt 120
agcaaagcat gtgtcattat aaaacatgat tgtaactcct ctttcagtgc cactgatttt 180
gtcgtgtggg aaatttttgg caggttttgg caataaagtg tctatcaagc 230

<210> 287
<211> 329
<212> DNA
<213> Homo sapiens

<400> 287
agggccacca cagatccggg catcctgatc aacattcagt ggcaagcctg gaggggcaat 60
gcttgcctcc cattgtatgg caggccagat atgttcctgg cccatcagaa gcctccttct 120
ggatgcagtc tataagccac tgtgatggat gagaagagcc caggatggag gtgaaagtct 180
ggaactggaa tctgagccct tatttttctg actcactgtt ttaccttgga agaatcactg 240
aagttttctg catctctgtt tcctcatatg tttaaaaaag aaagcactta accttggtgg 300
atgtgaaaaa taaatgaaat aatttctag 329

<210> 288
<211> 452
<212> DNA
<213> Homo sapiens

<400> 288
gaaatgcatc ttatagcaga gagctggcta cctgccaaac caaacaatcc ctgagactgc 60
ggcagggctg ggaagcaagc tgagctgcca cgctgctaac ttgtcaaaca tacataccgg 120
ctttgcttaa caacaatgcg acacgtgcct gctagaagcc taaggaacca acatcagaag 180
acagatgagc tataaatact tagaaagagt acaatccctc gatcaaccaa ccaccccaaa 240
ctttcttcat cctgttcttg aagaagtgct tctttactgg gagcgtgaca cattcagacc 300
taaggagcca ctgagaaatg cagcaaataa agcatagaga gcacatttga ataaaaggac 360
cagagaacca ggaaggaaca tcaagacatg agatctacag aatcaaagag aaagccctca 420
cattatatca tgagattnca atggcagaag gc 452

<210> 289
<211> 476
<212> DNA
<213> Homo sapiens

<400> 289
gtgaatccca ttctcatttt tgcagtatcc aagagctgga tgcctacatg atgcagtcca 60
cagtggctga gcaccttctg tccctgggat ctcagactct gcctgccaca gagcagatga 120
ctggaaaacc ctccccactt gctgtcatca ttcctgaaag gtcttcaggt gtgccagcaa 180
ttttcagact gaatatctac accagaaaag cacataacta ccatgagcat aagacgtggg 240
agtgccatgg agtgaccata gaagtataga cagtaagatc acagccagat acaacttctt 300
gttttataga tgagagacct gaggcccaga aagaggaagg cacttgccca tggtcacaca 360
gtgagttagt gagactggag cccaactctt caggggtctg ggctggggct tanccaaggc 420
tggttaggca atnggctttc ctggggttct gggcaaatca ttttttgcct actctg 476

<210> 290
<211> 458
<212> DNA
<213> Homo sapiens

<400> 290
gtcctgctga ggatccctgg tgcccagtag ggaacaccgt gaggaggagg attaagaaag 60
gcaccctttc cactgatttg catcgccatt tgtacatgga gtttggctac agcaaaatcc 120
gttgctatct caccagctac aagaagcaaa gaacgaattg caattcattt ttgtgctcta 180
ggacccggtt gaggtctcct tgctgacaaa aaaggaaatg acttctgaag acatgaaaaa 240
aaaaaacagg gngaanacaa attgggttan aataacccat gacctaaatc attanacttt 300
gactaatgaa naactgcctt ttaacagagt taaaattgac agcaccatgg cctcacaccc 360
aacaggggtt tgaggctgga cccttntttg acaaacgatg cccttgatta cccncaaaat 420
acccatcaca gcattattta taatattcct ggccaaag 458

<210> 291
<211> 471

<212> DNA
<213> Homo sapiens

<400> 291
gaatgcagct gtcaacagct attctaagta ttgttgactt gggtgaggag atttgtgtcc 60
atgtttgaaa atatgacatg acacgaagca aagagaattt caaaactcct gaccaaagct 120
ggtacagaga aaaactgact gctcaaagaa ctccatcaga tctttccagc aatctgtgca 180
tggagcgtgc acttgaaaag caagtgtgtt ttgagtgagc aggaggacag attcagccac 240
agagggcaag gagatcctcc tgttgccaca tttggaaggt gaaccattag ctgccttcct 300
ggcagatgcc tactgggggt ctggagcttg gaggtgacac atggagcatg tcctcctcca 360
ctttcttcct ntgtcagctt ccaagaaaac caganctgga aatcaaaagg ataccccaga 420
ggggcagtag ggccctccca natggctgan cagatgctgg caccatgcct t 471

<210> 292
<211> 349
<212> DNA
<213> Homo sapiens

<400> 292
aagcttcaag gactgaatcc tgacaggaaa caggcacctc caggattctc tccccagcag 60
aagattactt caagaccgga gttccctctg gactgactgc aagattgaat gtgattgatt 120
tgtaacctgt caggtccaca atggtgccat ggaacaataa ttcaagataa gccatcagag 180
caagtcacac catttggcac ctcctagccc ccttcctctc ttgcattcca agccccctctt 240
cttaaaccct tgccgtctct ccagaaattg gaaattggca atttttggaa aggattccag 300
ccactttccc cctcgctggc aacggataat aaaaatcact tttttttt 349

<210> 293
<211> 226
<212> DNA
<213> Homo sapiens

<400> 293
aaaaagaaca aatcacctgc tgcctcggca ggacaggatt tctgccnntn ccacctgtnn 60
gcagccgntc atggcttcca gacaaagtgg gggcccgggg cctgcagaac agtcggccac 120
attcaccagc ctgtctctcc tctggacctc ttggcacang cttttactct ccagactgtg 180
tgtgtttggt tgaattgaaa taaacacagc aggattttgt tttatt 226

<210> 294
<211> 217
<212> DNA
<213> Homo sapiens

<400> 294
gtaaatccaa gagtcaccaa atctttcagc ttttcagcta aagaaagaaa caagtgaagc 60
aatgggcaga aagtgntggn tttcattacc nagagccgtc ttcttccagc cnaaatgtaa 120
tttacatctg agtgtttggg ttcatctgtc acacgagtat tatacaaccc caccacttac 180
cctgaaaata aatatgagct cctcattcag gtaaatg 217

<210> 295
<211> 407
<212> DNA
<213> Homo sapiens

<400> 295
ttggtgaccc tgaggcacag aaagctgagg gaatttgttc gaagtcacac agctgggtaa 60
gaaagttggt ggttggttgt tgccactggc ctacggcttt tgtccagaga agacgggaat 120
gggggtccag ttacccaacc ccttcagaac agatggtttc tcatgcccat ggaccttggt 180
tacggagtgt gaacaggatt ctcctaaata tttcaacttc ggaagaccgg attgaaagtc 240
atctcaatta agcaaggact gagagtgtgc aaatattatt tgaacgttgg ttaacttttc 300
cttaaatgga aatgaatgag cagtaaagtc actttgatga atcttataca gagcctctgt 360
cccagagtcc tgaaacttca cctgatggtc ataaaagaat caaaagt 407

<210> 296
<211> 498
<212> DNA
<213> Homo sapiens

<400> 296
tgggagaggg ctggaagtcc attccaacca cagaatacag tcccttcatg gaaggaaagt 60
aatttaacag caacagtcca ggaatcagac aagctacggt cccagaggca agcgttggag 120
gggccttctg ctccacggag acactgactc cacgcagggt actgaccagg gcaggggacc 180
agagatgaat caactccagc ccgggagctc accgtccagc aggggagata aggcagatgg 240
aaaagtaact ataaaataag gcagacggtg ataagagtta cacaggagat acagatagca 300
ggcagtggga gttcagagca gagaggagtc tgggggatgg atgttagggg agattcagat 360
gaaggggagc acttactggc tttcctcccc aagaggtgcc ctaggatcca tccagaaaga 420
tcttgcggag cccacagagt cccaacggga acttgtgctt cttggatgga ccccttaccc 480
atactttacc cactttaa 498

<210> 297
<211> 441
<212> DNA
<213> Homo sapiens

<400> 297
actaagagtg ttcaaagaag aggaatcaca ctttggccag cagtatacct gcagccctgc 60
ggctaaagtt tgctgaatga gaatataagt gggctctcat tttgaatata aggaaaatct 120
gtaccagaaa tgccaaacaa ctgaattcaa aatgaatttc ttggaactca acactcaaaa 180
tcagagatgg ttcagagaga aggtatctac tgctaatttc taactaaatg aaagggcttc 240
tgcttctgag agcaatgata cccggaacag gaacgaaatg ctgctagaga acagtgctgg 300
aagtgtgtcg acnaaactgg cttcttggtc tagtctatgc cactttccnt ggataatgga 360
gagnccatgc tanggggaga aaagccaatc ananggcttc agctgggncn gnnttaaang 420
gaatacatca atgggaccgg g 441

<210> 298
<211> 593

<212> DNA
<213> Homo sapiens

<400> 298
gactctgggg actccttctt aaatcaaact gaaggacccc agccttttt tcgccccgaa 60
agaattaang tcgggaatgc cttcccnana attngangga ngtnccgntn ccggggggnc 120
atttttcttt gtgggggtca attggggcgg gtggttggca ataacaaccc aaaatcttgc 180
ggaatcttgt ggctttttcn tcaaaatggg ccagaaggac gaacaagcac ttgtttcccc 240
aaggcatttt taaaaaaaaa gttccggagn aaccaaaact ggtcncagga gggatgaatg 300
naaattcact gtatcttaaa ggggtggggg naagcctgat gcccctnctg tattagagcc 360
cnccatgatt cttacagntn ggggggaaca acataatgcc catacatgaa nctggcttgg 420
gggctttcat ttttncccaa gaaaccaagg aaggggactt taagtcattn cccaaccaat 480
cgctttgggt tcangtttca tttcaanctt ntnttttggg acccannnaa ttnttgataa 540
aannaanccc aagcttcttt nttttggggg gatnaaataa tttaattggc ctt 593

<210> 299
<211> 537
<212> DNA
<213> Homo sapiens

<400> 299
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ngcttttatg gtttattggg ccaaaaanan cttactgggg aacctttcc cnaccnccag 120
gcttccccga ganettccac nattgaaaaa ggttctaggg ggcgcttaat taatggatgg 180
tgggatcctt taagggagaa aatcaaaggt cccccсttag agggacattt gacttcttcg 240
tggcagcagg gggggaattg gattgggagg taaagaaaga agctgtgagc cccagaatga 300
attnctggaa ccagccccaa gaangnggaa aggtgangga accagattct tagaagatga 360
cttangggga ataagccagg agcttaatcc acttctggng agactctttt ttaagaaaaa 420
aggngctcca aaatttnccn atcccaaatt taagtnttga aaagccaggn nttttggttt 480
ntaatgnngg gaggnaaata atttaaaaca tttcccccct ttngaagggt taacccg 537

<210> 300
<211> 270
<212> DNA
<213> Homo sapiens

<400> 300
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agcctggact tgaacacaga cagtctgact ccaaagccct ccaaagatgt aggttaattt 120
taacctacat ctcccagaaa atgagcaaca aaggatgtcc agccctccag caaactagtt 180
taagaaagaa actgtctttc ttttcttctg tacttgaggt ggggtggggg cagggaataa 240
acaataatca tgcatgcgca tgatttaaac 270

<210> 301
<211> 157
<212> DNA
<213> Homo sapiens

<400> 301
gacgtctggg gagctcctgc attaagtcag aaactgagac atggagcctt gctatgttgc 60
ccagggctgg gtctttgaac tcctgggagt caaagtgnat ccttcctttt ttggccctcc 120
ccaaaagcac tggggattac aagatgtgaa gcccact 157

<210> 302
<211> 200
<212> DNA
<213> Homo sapiens

<400> 302
caagaaactg agaaatgcct acccgcagga aatggggntg ggcttttttt agccntgctg 60
gantgtgaac aactggtgga atggtgccct ggcaaccaac cangggaaaa gggcaaatgg 120
tttattattt aaagggtgga attttctttg gtggaaccaa aaaataaaaa ataccaaaaa 180
ttttaaccct tttctttttt 200

<210> 303
<211> 284
<212> DNA
<213> Homo sapiens

<400> 303
gatgatgaaa ctcccatggg gccagccaca gcagtaacca gactcagaaa tggacattct 60
tcacactgag ctgcatcaac ccagggagaa gaagaggaga ggcaacacgc catattttct 120
aatgagttaa agcctaattt aatctggaaa taactaatgt tgactagtgt gtttccccta 180
aaataattgc ctctgatggt caattttata gctaaaccta aaaaagatga tttaggaaac 240
actgagaagt tcatccctct tcccacaata aaaatatact ttgc 284

<210> 304
<211> 353
<212> DNA
<213> Homo sapiens

<400> 304
aggactgaga ggagaaaatg agacactgag tgggactcag ggattgctcc aggccacaca 60
gtcagcagga ggcaaagccc agattcaaat gcagattact cagctccaca atccacatcc 120
tcacaggagg ctgcactcct tgcccaagcg tcagacagga gcaaagagaa agaaggcaac 180
cagctggcta ctttcttccc ttcttggatg cctccaacag ggtgagaagg actaaacaaa 240
tgaccaagtg tcatcccatt ttggacatac ttaaaacacc ccatggaatt tttattctga 300
ctttcttctg cctgtgtggc atttatgttt aaataaaaga gaattcaact cgt 353

<210> 305
<211> 423
<212> DNA
<213> Homo sapiens

<400> 305

atcctgcgng gtgtggctga acttcccacc canggganttg accagacttt gtcaacagcc 60
attcangaac tggcacaatg gactcacaga taagattcca ggggaagagg acatgttgtc 120
acnaacactt aggacttgaa atcctggctt gtggaggata gcatgacctc ttctcagatc 180
tgcaaaaatg ctgatgggca gattcaaaag agtcaacaat aacttcgctc tgacttggta 240
aaaactgctt ttggaagaga ttctgtttgg gaaatttgtg ggcctgagtt accagtcatc 300
tgttcctgcc acaataactg tcatcattgc ttcgaagcaa tgtttggctt ggagcagtcc 360
cgaatgagct gcctatcaca tgttgaccat aaaataagaa gaataaataa ctggcacaaa 420
ctg 423

<210> 306
<211> 431
<212> DNA
<213> Homo sapiens

<400> 306
ataaagaacc ctcttaggat ggtgaacaga aacactgaag ctgggatagc cccctgtcag 60
gggccatttg tcatttccac aggccaagaa cctggacgct gtccccacat tggggaaccc 120
tccaatgcat aagccaaatg ggaactggaa acacttcctt gttcccccaa ccccagggct 180
ctctctgcct gtcacacacg cctgccccag cagtggaatt cagagtccgc gaacgaagca 240
gcaggaactg ggcggcagtc gctgtttcaa gattcaaaag caccagccca aacacaaaac 300
cagtgtgtac tccgtggaca gaaagttctg agcagcgccg gtctagatga attattaaat 360
tgnnnannat tctnncaagg ngtanccccc attggaaccc agttttatta ntncccgaaa 420
tatattaaat t 431

<210> 307
<211> 333
<212> DNA
<213> Homo sapiens

<400> 307
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cccctctgtt ccccaaagtc ccctcctgac cgcagcatca atcttccacg ctggccccggc 120
cggaggtggt gccactggca gatttaaatg agagcatgaa ggtgggacct ccattactgg 180
attagtgtcc ttataagaag aggaagagac cagagctcac tctccccacc acgtgaggat 240
acagtgagaa ggtggctgtc tgcaagccaa gagccctcac ccaaacagaa tctgctggta 300
tcttgatgtt ggattttcta gcctccagga ctg 333

<210> 308
<211> 349
<212> DNA
<213> Homo sapiens

<400> 308
ctgggtttcc ctatccccgt gggcacgctg gtgtgccgtg tgttcttgcc aatggaatgc 60
aagtagaagc atgtgccatt tctgagaagc cagataaaac atgttaggcg ggctccttca 120
tgctctcttc tcctcttctt tctggaatgg cgatggccaa aagaaccttg gaaggcataa 180
actgaagaca gcttttacca cgaattcttt caagaagatg tgaaaaagat ccacccctca 240

acctgacact cccaacctgg actgttaccg tgaaangaga aataatcatg tatttgngtt 300
gcttgagcnt ttaacccttt tngntaaaag gtaaattgct tgagacttt 349

<210> 309
<211> 157
<212> DNA
<213> Homo sapiens

<400> 309
gtgaagaaac taagaatcag aggagttcta actgagccat gaggactcga ttcctgaaaa 60
ccttatttat aaaaaacagg aatgggaact aaaacaaggc aacctgtgca agcccttaca 120
agtttttcat gtattacagt aaaaggtaaa gcaactc 157

<210> 310
<211> 217
<212> DNA
<213> Homo sapiens

<400> 310
gaatgtgctt gccctccact tcctctctcc tcttcctatg gggctggaaa tatgtgggat 60
ttggagtgag ccaggttcca caatgctgat gagtacaata tttcaggaga cagcagaaca 120
gcatgaagaa agaaacctgg atctgcaagt gcccagcagt gagcagaccc caccaacact 180
gggccactgc ttctggacca tcctaataaa gtaatgc 217

<210> 311
<211> 650
<212> DNA
<213> Homo sapiens

<400> 311
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gaaaantnag ggcctgntng gagcnacccn aaatntttct attcttccgc anctgccnat 120
nactgnnggt agangnncgg gagcancatc ctatgaagaa aggaactagc tcactcggta 180
nnnggacnac natntttnat cctttaaccc tcaaggggna gtcattctcc tgactgctaa 240
ccttactttt gtaagctcct tgaacacaga tcactaagaa ttctagagga gctattccca 300
gaagacatac aaagactgcn gatccaaatg actcaagagg tgaaatgtaa tgtatgctgt 360
ggtgtacttc tcagatgcct tcaccttagg tctgaaatac tcattcccca acaatgcctc 420
catgctaaaa agtgttggta actaatgggt ctcaactgag cccctctcta agcattaccc 480
tggagaagcc canccaaagg gtaccttacc caaagancac acccgtatcc ctggagtcag 540
ctcacattca ntggactgnt caaagcccna gcantaaanc ttgggggcag aaattaatgc 600
aagggaaaga ccnctttga aaaggcccng attncctggg gaactggact 650

<210> 312
<211> 541
<212> DNA
<213> Homo sapiens

<400> 312
ctnaactgat ggacttggct agnccgctgc canccacatg gagtgggagg atcacggagc 60
ctgaagctga gaggccacag cactgcacct gacatatatt accaacttgc catgcaactt 120
catctcattg actccgcatt cccatttttt ggagtggatc acctgcagtt cccttgacaa 180
ctgagtgtct gtatttttct gtatcgtcca gtgtgatgac aactgtctac acaaccaagt 240
ctggccagca ctgaacacac tcagcttccc cacagtgctc caagtctcaa agcccaaact 300
gcagccaaat ctttggcagg ggttgncctc tggtcaggcc anaacacctt tnttgaanga 360
cctttctgaa catttttaaa ccattcgatg aatgacccta aattcttggc gcataatttg 420
ggactgntgc catcacgcca gaaacattta ttaaacactt actgngtcag ngctcaagac 480
ctgccatctt gnttnatntt gacaacagtg atgcacaata nggggtgnca tttcccgttt 540
c 541

<210> 313
<211> 295
<212> DNA
<213> Homo sapiens

<400> 313
gcccttcctg cttgctcact ctgatgatgc aagctgcaac cctgtaagct gttctataga 60
aagacccaca tggcaagtac acaaggatgg ctttggccaa cagcctgtga ggaactgaat 120
cctgccaata tccacgagta agcttagaaa cggaagttct aagctcccta ctctggcctg 180
gagatgatac tgaccaacac cttgaatgca gccttgtgag ggaccccgaa ccagagaccc 240
agctaagcct tgctcatatt cctgacccat gagaacaatg agatgataaa tgttg 295

<210> 314
<211> 161
<212> DNA
<213> Homo sapiens

<400> 314
gttaagatct aagaacgttc taaatctctg ataggatttc tttcaagtta agaatgaaga 60
gtcaaaaagg aaaaaaaaag aagcactttg ccaaagacaa acctgaacca gcaacagagg 120
aataacagta aaacatgcaa ttaaataata atcaaatagc c 161

<210> 315
<211> 277
<212> DNA
<213> Homo sapiens

<400> 315
gacgcaagct gacctggtgc aacgaagctc ccatccaacc aaaatgggcc agattgtggt 60
taatggacct taccaagatt tcctacagac accacaccat cgggattatt gattggaagt 120
gtacgccact acacttgact gaacttgaag ttgtagactt tctcaaatgc ttcaagaggc 180
atttgatagc atcattgttt ataaacaggg aaaaactgga ggaaacctaa atgtctaaca 240
actggaaaat ggttaaataa attgtggtac agccatt 277

<210> 316

<211> 135
<212> DNA
<213> Homo sapiens

<400> 316
gtacccagtg cacgtcctga tctccagctc tccagcggct tanaacagac acagaatggg 60
ccgggaccag ggacccacca gagacgtctg tagttaatag ctggcgctct tccactaata 120
aagttttatt gaaat 135

<210> 317
<211> 562
<212> DNA
<213> Homo sapiens

<400> 317
taccacgaca acagcctaac cccaactaag gtaaactctg ccaccaaaca tgcctgggaa 60
tggagaaggg tctgcagatg agaacccctt ctggttctat gattcaaatc ttcattcact 120
caaagcagga accaaatcca gtgctcctcc attgttggaa taaatgctct ttgcctgaat 180
gctatttgtg gtcttcgtag aatggagagt aactgaaggc ccaccggaa atcaatttta 240
tgtaagcttt tcattctctg gcctcaagta tttctaaaat gtacctttct atgcaggcta 300
cttattcagg caactatttt cangggaaga tactcaaatg aaaatagaga atccctttg 360
gccttttgct aatatttcat ttgtcaaaac tttgatagtc tgacaaagtc tttaccatga 420
gattggtaaa ctcacggaag ccaaactgtc tgggatgcga cttcaactnc ctacttacga 480
actncataat aatggcctaa cctgcctata cctcaanttn ccatctataa agacaataaa 540
agccctattt cctcaaaaaa ag 562

<210> 318
<211> 362
<212> DNA
<213> Homo sapiens

<400> 318
aaataacacg gaaagacagg cctgttctcc cggaactgac agtcggaggg gaaaaagaag 60
gaaggatgct gttcgaatac aaaggaaggg gatcttaccc aggctggatg ggagaataga 120
acatatggtg tttccattct ctctccagtc tttcaacccc atcatgtttc ctgccctgga 180
gagttgcttt gactatcaga gaaggcatac tataatggct tagttggagc aaataaagag 240
gcaggaataa gcctgtttgc tgaaaggagg tggaaaagcc gtgtgcagag ccattatcag 300
aagtacccac tggaccaagg ccttccgtgg nttccagcan aaaagtaacc ttgattattt 360
gt 362

<210> 319
<211> 410
<212> DNA
<213> Homo sapiens

<400> 319
aaagatccag attacctgaa gctgtggttg gacacttttg tttctagcta tgaacaattt 60

ttagacgttg actttgaaaa gctgcctacc agggtagatg atatgcctcc aggaatatct 120
ctgcttcctg ataatattct gcaggttctg aggatccagc ttctacggtg tgttcagaaa 180
atggcagatg ggttagagga acaacagcaa gccttgtcaa ttttgcttgt caagttcttc 240
attattcttt gcagaaatct atcaaatgtg gaagaaattg ggacttgctc gtacattaat 300
tatgncatca ccatgacaac gctctatatt cagcaattaa aaagcaaaaa aaaagaaaag 360
gccagcgagg ccaattcagc tnggacttaa ccaggctgaa cttgctcaaa 410

<210> 320
<211> 27
<212> DNA
<213> Homo sapiens

<400> 320
tgttttttaa gcaaaaaaga aaaaagg 27

<210> 321
<211> 207
<212> DNA
<213> Homo sapiens

<400> 321
agacctgtat tgccttaaca ctcccagcaa tgaccacctg caagcttgcg ctgcgactcc 60
cgtccgaaga catgcgggcc agtatgagcg gagaggttcc cagcaccgtc acaagacccct 120
gtgctattat tttagactca cctgtggctg ttgacaacac cacacacatg aaatgatgct 180
caccagaatc aaaatactca gctaaac 207

<210> 322
<211> 400
<212> DNA
<213> Homo sapiens

<400> 322
taannngatg tacatggact gatcagactt nctgaccttg ngacanatcc tgccagtaac 60
atgagaggaa atgagaacga ggctttggag cacagcattg gattgctcat gcagaacacc 120
acccagtgcc ctttccctct gtcacaatga acagccatgc tgcaggtgac ggctgctctg 180
tcaacatgga tccggcaggg cagatgagtg gatcccccag cggactcatg agagagcaaa 240
caaaaagtcc atatgtgttg tgctaatcca ctgagattgt gttggttgtt acggagccta 300
acctagccta tcccgacacg aggatcagac atgataatca aatgtgttta taaagtgttg 360
gatggaaata ttctgacaac attaaaagac tctacccaag 400

<210> 323
<211> 197
<212> DNA
<213> Homo sapiens

<400> 323
gaggcatgag gaggtgagag atggaaagaa tgctgtctgt catttggagt cagaaggaaa 60

agaaggttga gggtctgcca gctctgctct agtggttttt tcctgtttca ccttttacaa 120
aatcgagata atcgtttcta cttggtagcg atattgtgag gtgtaaaatg gattaataca 180
tgcaaaatgc ttaaagc 197

<210> 324
<211> 360
<212> DNA
<213> Homo sapiens

<400> 324
gtgaatggac cctgagaggg cccagccatg tgatggaatg agccatgatc cctgagtcct 60
cacctcaggg agagatgtgc agaagagcca cccaagtggt gatgtgctgg taaacattta 120
gtgacccatt tgaggtgtgg ggggaggctc taactggtaa catttgttaa tttctgtaat 180
gcatactcct actaaggctg cttttaggca accaacgtga tgtcactgaa cacagtttgg 240
aatggatgca cataatcagt tctcatgatc caggatgaac cagccctagc ataccactgc 300
ccctaaccca catatnactg ngcatcnttn aaaaataaac atattggggt taagcctttg 360

<210> 325
<211> 428
<212> DNA
<213> Homo sapiens

<400> 325
aataaacctg aagttctgtg cgcaccgaag acataaatga cataaatgtt gatggaagga 60
gaaggatttg aggaaggacg agagtctgag gaacaagaaa ggactgcagt agtgaaacag 120
cggaagaaac gagatcattt ttctcttata aaaattctgt aaacacagcc attctttctg 180
tatttgtaat ttgaggaccg actggagtta ttcctgagag ggctatgttc ctgagagaac 240
aaaattattg tttttgaaac tctagagaga actgctctgg caaaagaaat gtatcttttc 300
atctacagcc attctgaggt gaaagatctc atgatcactc tggactatac aacccacaag 360
cagacttcaa ggatacctac aggaacccca gtagtcctga ttgatcacac aggccctaaa 420
gaccctat 428

<210> 326
<211> 431
<212> DNA
<213> Homo sapiens

<400> 326
cagtctacta tgggttcata acaaatgagt ccccacattt acatcaaact acctcggcct 60
agtccttgtc ttcaggaaga agtacattta cactctacaa atcaacaaga aaaactctca 120
gaataggaag cctatgaaaa agctatcttt atttctcgtt gtgtaagagc ccatttctaa 180
tcctgacgta ctcccgtttt accaagtgca gtggcatgtg ctgtagtccc agctactgag 240
aaggctgaat caggaggatt gtttgaagcc agaagttcaa gttcaacctg ggcaatatag 300
tgagacacca tctcaaaaca agcaaacaaa aaagaatcat cacttgagtc ctttctcaac 360
ctcagaaagg gtcattatct cttcacctta caatgagaaa cctcaactac tggtcaagct 420
taacagctaa c 431

<210> 327
<211> 90
<212> DNA
<213> Homo sapiens

<400> 327
ggttgcagaa cgtataaaaa cacatgaaaa atgatcacaa cagtacttgg cacataggaa 60
gtactccgta aatgttggct gatccaccac 90

<210> 328
<211> 212
<212> DNA
<213> Homo sapiens

<400> 328
agaactgagg actcagacct gggagaacac gccactgccc agacacgttc agcgacagat 60
aaaacagtat aacattttgc aaaggcaaat tcctcctctt ctgctgtaga aaaacttggt 120
ttcttcttca tacacactga gtccttctgc tcataatgct ggtcctaaac accttaatcc 180
aaaagcagcc aataaaaagt ttttaaaagt cc 212

<210> 329
<211> 256
<212> DNA
<213> Homo sapiens

<400> 329
gtgtcagaaa atgccacaga gcacagaaga caagaagagc tccctgctgc atatattgca 60
tcttccgttg ggcacagttt cactgatgtt atctgtaaac agaaagggtg agacgtgatg 120
actcagccaa ccctccaaat cctgagggtc atctatgctg ccggaggcag aaagtgtcac 180
tcccgtttca ctcccccgcag ctgtgttgtt tggaatttct gaagatttta tttttgatga 240
gcaactttgg gagacg 256

<210> 330
<211> 386
<212> DNA
<213> Homo sapiens

<400> 330
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tacaaagtca aggatcgaga ccttcctctc cgtgttccag aatccctcag gaaatacgcg 120
catgccttcg catctagagc aagcgctgca agaattcaca gaacggccag aagttcccca 180
tcccgctggt ggcactcact gcgttaggcg ctcagcctcc agtccgggcc gctttggctt 240
gaagacggcc gttttccttc ctgatacctg cttctagtct ttctgcaact tctggattcc 300
tgtcattctt atacctgctc tgggcagcct tccattcatt ctgcgaattc cctgaagctt 360
ttcaataaat tgcttttctc caattt 386

<210> 331

<211> 200
<212> DNA
<213> Homo sapiens

<400> 331
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atatgccagc gtagaagacc ccaagtcaaa ggtcaaacag ggcacttgat cactcaagtc 120
ccccgctaga ccccttctg cgtgtacttt actttcgttc ctgctctaaa atgttgtaat 180
aaactttcac tcctgctcgc 200

<210> 332
<211> 42
<212> DNA
<213> Homo sapiens

<400> 332
ttggctagag atttactaca tccgtccttg gaagaggaaa ag 42

<210> 333
<211> 448
<212> DNA
<213> Homo sapiens

<400> 333
gtagatgggc cagacgagtc taagaggcag ctccgggcat ctctgagcat tgacttgcgg 60
acgttcccca gccctggagc tccatccagg ctgggaagag ggaggaccgt ggagattttc 120
atgagtgtcc cagcagtgag aatggactct tgccgggcag acagacacag caaggctctc 180
ctgggtgctg ggggaaactg aagctgtcag tgtcagctcc gaaagctctt tggagaggct 240
tcccaaggtg ggatgcaccg tggaccaggc tccaagtatc gtcagaacta ctggaagatt 300
gttttcaaga taatctggaa caggaagaga agacacaaaa gccccagaat cagagcagct 360
ctttgcagga atttgattaa ggaaatgaga cagggctgga tgcagtggct cacgtctgca 420
accccaaccc ttcgggaggc tggaggtg 448

<210> 334
<211> 246
<212> DNA
<213> Homo sapiens

<400> 334
atccccgctg tttttctgcg tgatgctgat tgctggctct ggttcccagg aggcgcccaa 60
gatcggatta actgccagct tcctgatgca cagccttgtt atcagcgcct atatccttgt 120
tcagcaaagt gcctctccac caacttaatg ttcttttcac caccccattt ctgcacgatg 180
tagtcacagt aagacacaga gtgtgcagtc ccgatcccag tgctacataa taaagatcca 240
gagctc 246

<210> 335
<211> 356

<212> DNA
<213> Homo sapiens

<400> 335
gcctgcccat ggctgctcat ggaacaatcg gctagcgttt cctccccctct gagatccata 60
aaagccggca gctcagccag agcagggcag agggcagagg acagagagat gatgggatga 120
cccgctgcag agaggagcta ccctcctgct gagagcttca gagacctgca gagacttcca 180
aatgatctgc ctgcagagat gagccacgct ttccagggct ttctctctgc tgagagctga 240
gtacttgagg agagggcctg cctaggagcc gacctgacta cagagaggat ctgccccactg 300
tgggtctctt ctgttctaac actaaataaa gctcctcttt atcttcttca cccttc 356

<210> 336
<211> 225
<212> DNA
<213> Homo sapiens

<400> 336
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tgagagagac ccccaagttg tgtgatcacc tccagcacac tggagactga gccgtttcac 120
aaggtgtcaa acctacattg cagcctgaag gatgtcttca cttcctcctg ctccttcgcc 180
ttgtatcctt catagatttt tcccgcaata aaactttgca tatct 225

<210> 337
<211> 431
<212> DNA
<213> Homo sapiens

<400> 337
atctttaaat taactaagga tgaggaaaag tttgtgttca gttcaagatc acaatatatg 60
gagaccaaag agctgggtgt aagtccaggt tctagccaaa ctgcatcagt ttcctgcccct 120
tggaaacaaa tgaaagcaca gagacactca gagaaaagct gccatcagca atacatattt 180
caagcggaga gcaatggcta acctgcttct ttcgggggcc caaaggaatg ctgccattgg 240
aaggcacttg acgagatgat atgtgtccca gcatcagtat catcattccc aggtgaaaga 300
cgggagagag ctgctctgtg tcacaaccct gttcttaatg ctactcaata aatttctatc 360
tggcttgagg gcaaagaact tgacacaatt tacttagaat ccnaactgga aataataaaa 420
atctttcata g 431

<210> 338
<211> 244
<212> DNA
<213> Homo sapiens

<400> 338
gctggagtgc nanggcacaa tcttggctca ctgcnaccaa gagaagaggg ggaaagaang 60
ganaaggggn ggaaggaaga tggaagagca ggagctncaa aaaaactntc cgctttgcca 120
cctggaatgt ccacccagga taaaaagatc caagctcttc tganactgnc ttttgacctt 180
ctanaatgcn nagacaggac ggngattgtg ccctgaaaga tcctcccaat aaagatctcc 240

cttt

<210> 339
<211> 378
<212> DNA
<213> Homo sapiens

<400> 339
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gagaccagaa tcctgacttc tggatgtgac aacaatctaa caggattctc tgatgcagac 120
tagcaggagg tatgaacacc cctcccaagt cttcctctgc caatatgaaa agctgctcca 180
caaatcttgc ccctatacgt agagggcgan tgaagagaac actgatctca atttcaagaa 240
gaaactaaag aacatctnca gatttttctt ctatctgaag agtcaaaact aattaaactg 300
caataacttt ctaccttgnc ttcaaatctc tttacgttca aaacttccat taacccattt 360
catataatct ccactacc 378

<210> 340
<211> 239
<212> DNA
<213> Homo sapiens

<400> 340
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tggaaggaaa ataagtgaga tagagtaaag atgactacat agccaattag aaaaagcaac 120
taccacctcc actccaaaaa agtcatgtaa ataacttcta gtctgtgact cgtcttcacc 180
attctgtgca ctggctttaa aggagcgttt tacactcaaa ttaaatattc tctttgctc 239

<210> 341
<211> 308
<212> DNA
<213> Homo sapiens

<400> 341
gcacatattc atgtatggtc actttaacgc agtgctaccg tctgagacgt gtcggacaaa 60
ggcctgggca gaggggctag aaaccatgta tcaccaaagc caacttcttt cccagatttc 120
agaattgctg gttcaactgc aaaagtagga aggcaatgag taatttctgc tctgctggac 180
tagattacca ttaactacca tcatgacttc agaagatgct gtcacgatga aattcatttc 240
tgctgcctaa ccccataata aggctggctg ttctctttaa gtaaaatgac taagctattg 300
atcttttc 308

<210> 342
<211> 439
<212> DNA
<213> Homo sapiens

<400> 342
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aaatccaggg aaaggctggt aggaaccagg agctgaagac agagctgtgc gccttcctgg 120
ccatcctcct taaatctgag atgggaatcc agccattgca ccagtacatg gatctgcaat 180
ttttttcttc ttcaaaggac caaacggtga atactttagg catnggggac cataaagttg 240
ctgtcacaac tattcatctt tgtcactgta gcttaaaaac agccatacac aataggtgta 300
catgccaaat gggcatggca gactaaaaag actaaaatga caaagcctct atgaactagg 360
agaagaaagg cagtaaggga gattaaacng agctgaaaca aaaagggtga tgcataaaag 420
aaagagttgg aaaaagatg 439

<210> 343
<211> 463
<212> DNA
<213> Homo sapiens

<400> 343
ctaannngat taggcataga ccnaaantga anactctgga tgtggtggct ggctncttgt 60
gaagaagaat tcaatcagat tccatttgat taatctgcat tgagatccta gtatgtgtcc 120
gacactatgc agaaatactt cactccctct tccatggcag accacgatga actagggttt 180
gctgttttca cggcttctgt cactgttgga gctgaggctg aggctgcagc aggagctcct 240
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tttgggttaa agaggacttg ggtgacccca ccctgccagt catccaccct ctggcagcca 360
gggcggcagc aggggagggg gcagaaggct gccacagngc ttctctcccc tgccatttcc 420
tctgcagctc cctctctggc cctgtttttc agacctctaa taa 463

<210> 344
<211> 352
<212> DNA
<213> Homo sapiens

<400> 344
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gatggtcctt acaaattttg caattggaag gatgaggcaa aatgaggcca aagatgaaaa 120
aaccaaggcc tggataacta attcacagcc acacaagtat ttagtcgcaa aaaatggtaa 180
tagcatgcag ctctctctgt tcagtgccct tttcaggatg tgaagaaaga tatctgtata 240
aatatgagaa gtccttccca aataagtaaa gtaactggca taactgagga gctctttggc 300
aaatctactc tgtataccaa ctcaagaaaa acagggaaaa aacccccaatc tg 352

<210> 345
<211> 270
<212> DNA
<213> Homo sapiens

<400> 345
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gcctaccang tcnagtgggg caacagacta cgctcacgga ttctgctcac aacancggga 120
ataacagacc annagaagaa ctgcagagca tccctctctc ccccgttcac ccgtgccacg 180
agcacgtgag tgcatccaca ggcagcaccc agtctcctgt tccactgact ccagcgtcca 240
ctcactgnga gcctactaag tggccacatg 270

<210> 346
<211> 236
<212> DNA
<213> Homo sapiens

<400> 346
atgggaccat ctagttgcag gaaaagaagc tcaggggtcc tactgattct accttatgat 60
ccttcccttg ctactggcaa gatgtatgca tattccggat cccaggtctg ttgtcccctc 120
atgccatgtg gaagtttccc aagactatag agaaatgttt agatgtgcag atgccacaca 180
ctaattctta gagtttctac ggccattatg actaaaggga tttttgtata ctgttt 236

<210> 347
<211> 442
<212> DNA
<213> Homo sapiens

<400> 347
gtttggcttc cttgagacag aggatcttgc tcgcctcaaa gaggagggca gtttgccccc 60
ttcctcctga ctccaagaca aaagagagaa gactgaagag tgggatccag ggcctctcag 120
agttcacctg agctttccca agtctggttt gttctctcta ccctgctgct actactgcaa 180
gtgactttca caagatgctt ctgagcatag cattgctctg ctgtgaccac tgcagatgtc 240
aagagaattt ctgccttttg gaacttggac aatattggcc acctacccag agagaggaga 300
aggataatcc agacataaag ggagcttcca cccatccttt ggatctcntg ataaagagtc 360
atatacttaa agagccatcc tcacattcct gcccagactg tgagctgcat gagagaggcc 420
atgtctcatt ttggtccatt tt 442

<210> 348
<211> 443
<212> DNA
<213> Homo sapiens

<400> 348
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tactgggcaa cttcttcgtg ctgtaattga gtgtggccga ttgctcacaa agatgtttgc 120
aaaatccctc ctgtccccta actcacttct ccttgcagtg tcactctgcc aacttctcct 180
gtcggttggt gaagactgtt tctcctcccc cttcaatatg ggctgggctt gtaacttgct 240
tgaccaatag aatgcagaga aatgaaatgc agccttcaac attcaaggct atgctcaagg 300
agtctaaccc tgtggatatg ctgttgtcaa atgagggagc ttcgattagc ctgttgaaga 360
cacacagacg acccgacagg caataccaac attcaagata tgcaagttat gctgtcttaa 420
accatgctgc caagtgaact ttt 443

<210> 349
<211> 165
<212> DNA
<213> Homo sapiens

<400> 349

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cagagtccaa atggtcatca taagaaaaac tgcacctaac ttccacagcc tcctaggagg 120
cccagagaca tcactgtact tgcctgccat cctatgtggt gctgg 165

<210> 350
<211> 307
<212> DNA
<213> Homo sapiens

<400> 350
gtggggtctt tcaagccgag atcgcgccat tgcactccag cctgggcaac gagcgaaact 60
ccgtctcaaa aacaaagaag ctgtcattcg gccccagatt tgtgcctcga aaccaccacc 120
gtgaggtcgt ttcccacagt ctccgcggct tgggggctga caatcctgca caggaaaact 180
aggcgacatt cccaaatcat ccccttgaca gccctaattc tacttttaga aggttcttgg 240
taccatgaaa acgcaaatgc ccggtaaagg cagatttacc atgaagctaa taaagctcta 300
acctcag 307

<210> 351
<211> 286
<212> DNA
<213> Homo sapiens

<400> 351
gaatccgagt ttctgcacta ctggaaccac gcctcccaga gaaatcaagg agacaccaga 60
aaaacctcct caagggacag ggaaaaatca cggacaagct ttcttccctt ctcacctccc 120
cctaaaaaag cccagtgttt ttcttcccct ccagctatgc agctgcaccc agcagagaag 180
tactagatta gcatcatctg catttcattc cttttctttt gcaatagcta ctcgcctata 240
ataaacagac cttgtgctca agggagaatt tacttccccg tccagt 286

<210> 352
<211> 417
<212> DNA
<213> Homo sapiens

<400> 352
aactctgcag ttggtgtcag aagtaatggt gatcttgtgg actgtttcgt aactttgaac 60
agacaatgaa gaaagacact ggtaaaattc aataatactc tgcattctgc tggactaact 120
gctaccaccc aggctggtga tccataccaa gagactaatt caactggtcc tgtgacccct 180
actcaggaag tgactcagca taactcactg cacaaagaca gttttgacac ctctatgatt 240
tcatccctga cccaagcaat cagcagcacc cattccctag cccctgccca ccaaactatc 300
ctttaaaaac cctcatctcc aaattctcaa ggagttggaa tttgagaaat atttctcaaa 360
tatctcccat cctccttgct cagccactct gcaattatta aactctttct ctgctac 417

<210> 353
<211> 162
<212> DNA
<213> Homo sapiens

<400> 353
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tcttaatgga aatatcaaat ttctacatga tgcttccttg tctcttgagc tctaaaaaag 120
acaagaagaa aataaaaaga agtatctatt gttatttcat cg 162

<210> 354
<211> 235
<212> DNA
<213> Homo sapiens

<400> 354
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ttcactctgc agctactgct ccagctaatt tagagcagtg atgacaggct tggctgggga 120
gacatggcca gccctttgga aatgcacatt ccctaaccat actgtaaaat ggtgggtttt 180
attaacaatg tatagtgcta acataaacca ttaaatgaag cccactcaat tctgc 235

<210> 355
<211> 227
<212> DNA
<213> Homo sapiens

<400> 355
gcaaagccct cctgttccca gcccccaagtc ggttaaaccc atgttaaatc tataggttga 60
agacctggat cattcgaagc ccagagcctt gcacagcagc gatctgctcc aacagagggt 120
gatgtcatca tccgaggcca cacaaataat gcatttctca ccatcaaaaa gcctctgaag 180
ccatgttctc aaaggcaaaa aataaataaa taaataacca attaact 227

<210> 356
<211> 357
<212> DNA
<213> Homo sapiens

<400> 356
gatgtccgga agaggcaggt ancgtggaga cggagggtcg gcggggcaca agagaacttc 60
cagggccaca agcgactctg catgaagctg tgatggggac accgtgtcgt cgtccgtttg 120
tcggagctca cagaatgagc aacgctgcga atggctctcc tgtcagccgg gactttagtt 180
ggcaacagtt tatcagtcct gcctatcaac tatacaaggt cctggccgat gcaagacgct 240
gagcgcaggg aaactgggag ggggggataa gggaaccttt gtagtctctg cacagttttt 300
ccgaaaatct aaaagtgttc taaaataagt caattaataa aaccaaacaa gagcttg 357

<210> 357
<211> 369
<212> DNA
<213> Homo sapiens

<400> 357
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catagcaact gctttccttc ctgacctcct tggaagttag tagttgactt tgcagttgaa 120
gtacttttct gaaggcagaa gaggctgtca gccattttat actgacctaa ctttcttctc 180
ttgaaggtga actccctcat tttccagagt agtcaaggaa tttctgtgcc tctacccatg 240
gctttggtta ccaactcatc cctgggggcc ttggtttctt tctgtgaaat ggaatattca 300
ttccagcact caccaccttc taggctggag taaggctcca actttgcaaa tgctggtaag 360
taaactgta 369

<210> 358
<211> 170
<212> DNA
<213> Homo sapiens

<400> 358
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ggagaatnac ttgagcccaa ggcngtggag gctgcattga accgtgatca tactattgna 120
ctccagcctg gataactgag caagaccctg tctcaaaaca aaacaaaaca 170

<210> 359
<211> 430
<212> DNA
<213> Homo sapiens

<400> 359
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tgctgtgaac aaaaggcctc cctactggaa tccagaaaca tctgtgtttt tatggtcagg 120
tctatagatg tggaagccag gtcccacgcg ttgggtatgg ctgtcaccct gaagataccg 180
cagatcgcca acatcacatt ccccagtccc catctagtgg cctccagtgg cccatctact 240
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gtctgtgcaa gaggaggaag ccctgtgaga gggcagcagc ctccggactg gtacaaagcg 360
attcttctgc ctcaaccttn cgagtagctg ggattacagc aaaaaataaa attatttgct 420
tatcttcaaa 430

<210> 360
<211> 194
<212> DNA
<213> Homo sapiens

<400> 360
gaggacccgg ggaagaacca agagaagaca agaactgaag ttcttccatt cccacctctg 60
catcaccttc cctgctttct ctttccccag aagagactca gtcaacatcc caaagaccaa 120
tgatttcatt gttttacacc aaatatccct cctctaaatt tttcaagaaa ttgggaataa 180
acttcttacg caag 194

<210> 361
<211> 454
<212> DNA
<213> Homo sapiens

<400> 361
atggaaaaag aatcgcaaat aagcataatg tgaagagcat gagctttgga ataagcaagc 60
ctggaattac aattttcttt tattagctct gtggctgtaa cactcaactt ttgcaagctt 120
cagtttcctc gtctgtgaaa tggaataata gcacttacct cattggctgt tgtatggatt 180
aaatgagacc atgactatgg atgtatggca tttggtaccc aataacccct caataatcgg 240
cagctataat tattcataat aataatggtg gtagcaacaa acccagccca aacatctgaa 300
ggaccgatca ctaaaaagaa gatgaactca gtcctacgta gtaacaagaa tgtganatct 360
atgttggtgc caaaagtctg gangagttgc caggaccaga aaaaaaggan ggggtgangn 420
ccgcctggaa naagganggg acagatgtca aggg 454

<210> 362
<211> 273
<212> DNA
<213> Homo sapiens

<400> 362
actccaatta gtctccgcaa tgcagtcaag cagatctcat gaagatataa atctcacagc 60
cttctctaaa acttctccca ctgatatctg ggatcctgag gcaagagtga cagaggcaac 120
tactcagaaa tcaggatcca tgatcaaagg agcaacagca gtgtcaacca agaatgtgtt 180
tttagcaaat cttcctacac actcccccta ttctccagcc atggcagtta ttaacctttc 240
cagaatacaa taaagcctct gtgattcttg gct 273

<210> 363
<211> 387
<212> DNA
<213> Homo sapiens

<400> 363
gaaaactgct gcagagtgag agtcttctaa atggattaag aagcctatct caatccctct 60
ggagagtcct cttcaattca caatgaagat gttgaagagc agggacagac atcaacactc 120
ctctccccac cttcccccact ggcagaggca ttcaggtcac tactagtgtc tctctttctc 180
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ttccctctct tccttcttac ctactaaact cnatatgtac caaaatcagt caaagctcta 300
ctatctagct ctctttatct agactaaagg gagttgtcca cctcttggtc tagataacac 360
ttgcaaataa agacctgctc gtttccc 387

<210> 364
<211> 101
<212> DNA
<213> Homo sapiens

<400> 364
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acaaactcaa ctcttccttg tcattaaata atttgccagt t 101

<210> 365
<211> 443

<212> DNA
<213> Homo sapiens

<400> 365
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aatgctttgt ggcgtcatca gctgcccacc gtgagctggt caccactttg agtccagttc 120
cccctggcac cncttgccta gtggataata tcatacctca ctttccagca gagaaaccga 180
gctgcagaag ttgaatgaag gtctctaggg atgctcttgg gtccatcatt cattatgtga 240
aatatgaaag gcctcaacca tatgttccca agcccctggg ttgctgactg gcaagaggag 300
agaagccact ccaccaagct gaaacagtac ctgtccctca cggtggggag ctgaggcagc 360
cagcaaccag tcaatttttg caggaccaga agcaccatta gaggccttgc ttgctgattc 420
atttccatac ctcgttgatc tcc 443

<210> 366
<211> 213
<212> DNA
<213> Homo sapiens

<400> 366
aggagaaagc tgaagcacaa gatggttaaa aggactgttc aagacagcct tgcaattttg 60
accaaggaag aaagctgaag agtgctaggg caagagagga actacgtcca gaacaattca 120
taattccaaa ttctcacttc catgatttca atgctgaatg tgtacttctc tagctaaaaa 180
tacaattgct taagtaaaat catcattatt tac 213

<210> 367
<211> 261
<212> DNA
<213> Homo sapiens

<400> 367
gctctacttc tccaaaagac gttacatatt ccaaggatcc tgcgtctcaa caaacccttt 60
cttctgcaaa agaacagcct gcttttattc caagctctga gattccttat aggaagctgt 120
ttctctccag ttatgccatg ttatgcctta acctgggcca acagtgccta cacacggaga 180
atgcaatggt tgaggccaat tcattaacag ggattgttta gccacatccg ttgttaattg 240
acaacatgtc tatggaatta g 261

<210> 368
<211> 455
<212> DNA
<213> Homo sapiens

<400> 368
ccatccccga caaggtacca gacatatgag tgaagaatca tggaccctcc agtccacccc 60
atccaccagc tgaagaccat gagtaacctg ggccacatgg agcagaatac ccagctatgc 120
cctgcccaag tccttggctc gcaaactcat taggacttgg attgatggac tctctagcct 180
gagactgagg ccctccttct aatgaatggg gcagaaccaa gcaccttcaa cctcatatga 240
agagcagtca aagaaagttt aaagcaaaat gaccataggg ggagggcagg tttgtgtgca 300

gagatggccc tgaagaagag tgctgccatg gcaacacaaa gacagcagac aggctcatgc 360
acttgccacc agtggggttc taataaatgt tttggggagg catggagatg gcatgtcttg 420
cctgagtcaa caatcagaaa aaaaaaaagg gccgg 455

<210> 369
<211> 192
<212> DNA
<213> Homo sapiens

<400> 369
gaacccttgt catccagaat ttcccaaagg atggtttgca gaacaccagt ctcaacagaa 60
aaatctgtgg aagaagtgcc ctgtgatctg gcctatttgg aatactccat ccatcttttg 120
gaaaattaaa atatttatgg tcaagttaaa ggcgctgaga agtcctgcag taaataaacc 180
tgtatttact tg 192

<210> 370
<211> 235
<212> DNA
<213> Homo sapiens

<400> 370
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ggcagctttt acaggaaaaa gaacccgagg gaagctgttg gcagtctgtg aaacgatggt 120
catggtggaa ttcgtttttc tgcacattag atgtttaaaa cagctgnaaa aaagaaaaaa 180
aggccagcga ggccaattca gcttggactt aaccaggctg aacttgctca aaagg 235

<210> 371
<211> 137
<212> DNA
<213> Homo sapiens

<400> 371
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cccgtgtaat tgaaagtgat tgttgaacat tgctgatgaa gacaaaccgc tatgtaataa 120
actgaataat aacttag 137

<210> 372
<211> 186
<212> DNA
<213> Homo sapiens

<400> 372
atttaaggat tcaatatgga ctgcctcaaa tataaaggga cacatttgct acatggtcca 60
gagacttgtg ttcctggccc agaatctcct tgtcctatca attgttggaa agacactgcc 120
tgcatttgcc cttttgcctc tctctgttct gtacttgcac tatcaaataa aaacaatttc 180
taatgg 186

<210> 373
<211> 163
<212> DNA
<213> Homo sapiens

<400> 373
atttgtaact ggggatcccc tggaagaatc gtctggaaat tacgaccttc atctggcgat 60
tgcagctgtt aaagtctcca aagaggccat tcttacattg tgttgtgaaa ttattactct 120
atctcaaatc tgtgccagaa agaaaataaa atgtgtgttt atg 163

<210> 374
<211> 64
<212> DNA
<213> Homo sapiens

<400> 374
gtatcatcga aacaggaatt ccctgacttc agtaatgagt atttataaat aaatcactat 60
aaac 64

<210> 375
<211> 337
<212> DNA
<213> Homo sapiens

<400> 375
aaatcacttg caaggaagat tcagttaccc actgctacac tagaaagtta ggcttctctt 60
gcggcattcc acagtgaatc ccttcatcaa cacctggatc ttacaaaatg aagtacctca 120
gcaagctatg aagagaaagg gtgttctacc cccttctact ttctgccacc tcaccacaat 180
aaccaatcct atcatcatca tcacaactgg ctccttcata cctttaaggt cccttcaaag 240
aggacatcct tgaccacttc ccctaaaata tatatcccct tccatgagtg tgctctctca 300
gcaacctttc tctcagcaat aaaattaatg tatcatt 337

<210> 376
<211> 62
<212> DNA
<213> Homo sapiens

<400> 376
aaatcatgcc caagttcaaa caacgaagac gaaagctaaa agccaaagcc gaaagattat 60
tc 62

<210> 377
<211> 170
<212> DNA
<213> Homo sapiens

<400> 377

attggagagg atgaaggccc tgaggtccaa gaacatggaa acctgacagt ggacgccaac 60
agctgtggag agaagccggg cgacagctgt ggagagaagc cgggcgatat gctcacgctt 120
ccgtgtgccc agcaatcctg ctttatcttt ttaaataaag gtgattcctg 170

<210> 378
<211> 313
<212> DNA
<213> Homo sapiens

<400> 378
cacctaaagc agtgactggt gcatgacagc tatggaagaa atgcgtagga taaatgcatg 60
aaagacagga agagaaaaag ccaactgggc acagggtcaa aaactatgaa tgaagagagc 120
accacctaaa agactgcttt gcagaatcaa atgccacaga gaagcaaggt aaaatcaggg 180
gtgaaaaaag aaccgcctgt gtccactggt cacttttgtc ctcatgtttc catggcataa 240
taagaattta acagatgcat ttcgatggat acaaagaaga cattctgggt taataaataa 300
cttttgtaat atg 313

<210> 379
<211> 223
<212> DNA
<213> Homo sapiens

<400> 379
gcagtgttgt aagcacgggg acagagacgt acgtgagcag atggaacccc cgaagacctg 60
cagctgtcat cctgggactg tgtgcccggc actgtgctaa atgctccctg gggcatctcg 120
tgtaaccttt gcaggaaccc taaaaacgac gatcagatta gcctcctcct cttgaaaatg 180
gagacaaaat tcaaataaca taaacttcac cactttaacc att 223

<210> 380
<211> 444
<212> DNA
<213> Homo sapiens

<400> 380
atatgaggtt gttgtatcct aggaaagaat gtcagcctct tgcatcccct acaattggtg 60
agagaagccc tgacctcaat agcatgagaa gacctggatt ctgatgcgag ctccactagc 120
agcctgctct cctgactccc cagtgatcat ttctcctgtg tactctgggg ctgataccta 180
ccctgtcctc ctgctttgcc cttgaggact ttagatgagc aaaatgcaag agacattcct 240
atgaaagtga tagattgtag aggtaatgaa gcttctcttg tgaatatgtg attgtctctt 300
ctctcttgtg tgatgctgag acgctgaaca gagtaactgg tacgtagcaa taattcctca 360
tatttttgca attctgggga aggaggagga agaggatgat gatatgaaaa cgggaaaaag 420
agagaggtga tccctatggt gggt 444

<210> 381
<211> 403
<212> DNA
<213> Homo sapiens

<400> 381
ggtcttgctg tgtccctagg ctggagtgca gtggtgcagt ctcaattatg ccagatggct 60
ctgaggtcca agtaaaagat aatatttgca accaaatcac tggagttgac catcaaaact 120
cttttccagg tggaaaagca ccctgaatcc agcttcctgc tatgaatgaa tactgagctt 180
gggttggtgg aaattgattt tcgagataaa gaatccagcc aggactgtga agcccccaggg 240
aatggctgca cttcaagtca gaaggagcct gggtccctga atcatcatgt ggaaggctct 300
ccacccagtt caatggtgca atggaccaca agcaggaact taatttaaaa atgtgcttat 360
ttttggtaga ttttgtaatt aaaaaatgaa tcccactctg ctg 403

<210> 382
<211> 379
<212> DNA
<213> Homo sapiens

<400> 382
gcactacaag caaatgccaa atacagggaa agtcaactag atggcagcac aagggaaatg 60
atccctcagt cattccgggc ttcacaaggg aggatcaggt caacaatttc ccagcactct 120
ctgaggatac ggaagggctc agaactcctc ctcctccacc tcctagggct ccttccttaa 180
attttgtaat ctgcatcaca tcatattgca gggatgtgct aagaaacata cagacatgaa 240
caccccgaaca agaggaagct gaacaaaaat aacttccatc gtacctagaa aaaaaaactt 300
ctactatatt ttatataaca gcagaagtct attccatctt ctcttctgct ttaaaaataa 360
aataatcatt ttccaatcc 379

<210> 383
<211> 448
<212> DNA
<213> Homo sapiens

<400> 383
cagaaactga ggttatttgg atgaaatgct tatttctttt ttaacataag cattgactgg 60
aaatattggt tattctgtct gatattacat gaaggtcaga tgccctccat gcaaccatga 120
ggtcggatgg cagtttgatg ctgaaccagc aaacaagcct actcagcatg agactatgag 180
tataaaaacc tttatgatga cctacctcca cttggatcaa tgaagagaat aagagttggg 240
gacataaaca cattcaggag agaangaang acccatgttg atagtcacag ggaagaaaga 300
acagctcanc ctaacattac ccaagggcnn tagaaggcct gtacaaanaa ataccanccc 360
ctgantggac cnnccttntg atcctttggn accttcccag gctttcccag aanttacaag 420
ggaaaaaatt anaaattttc ccggtttg 448

<210> 384
<211> 278
<212> DNA
<213> Homo sapiens

<400> 384
gcaggaagag tccctcagca gctattccag ccccagtgag aaaccagaaa agatgctgag 60
acgttatgag acagtgaaga ccgggatcta tcattggact aacacagcaa tcatcnttaa 120
catgcagaga ggagaggaag acttgtttca tctcattcat gttgcaggga gacgccaccg 180

atttgagttt caaattatgg cataatagct catttatgca aatcataaac aagattatat 240
aatgttgttg tgaatgaaat atacacacca atctaggt 278

<210> 385
<211> 162
<212> DNA
<213> Homo sapiens

<400> 385
tgcaaagtaa atgatggcag tgtcctacgt gacagcaggg caacaagata gaaggaacct 60
ntcaccgaat gaccatgcag agcaaagtta ctcatcaggc aatgactact cataccagga 120
ttgctacatg agcagtaaat aaacttcttt gttatttgag cc 162

<210> 386
<211> 447
<212> DNA
<213> Homo sapiens

<400> 386
ggcctcacca agagtcttgg cgtgaaggcc gacaatgcat atcctgccag gccaagaaac 60
aggaaaaata taaacaccag tgatagagac aggaggcagc caaggacccc tcctgccccc 120
aacacctgac gaaatgccgc cttcaagcct aaaacagcat gagggatgaa aaaccagact 180
gccggtccgg atgaagccca cccttttccc caaatgattc tttctgaata acgcccatct 240
gcacattggg aggagggggt ggggccttgg gaagtttgca ctgtttgcag gggggaggag 300
cctggtctct ctcgtttctg tgtggtaagg tgggatttaa tccctgagat ggagagcctg 360
ttagcaggac tcttatctca ctttgctgat gcgtatttcc tttttcattt ctgcctaata 420
aattccactt gtcacccttc aaaaaaa 447

<210> 387
<211> 303
<212> DNA
<213> Homo sapiens

<400> 387
gcatagggat ttccagcttt acaacatgct atgaattatc ctcctctgtg ttaacacttg 60
tgttaacctc atccgaagtc ctgggggatg tcctgttcaa cctgccattt cacccatagt 120
agagttggtc cacagtgaaa agtggtgaaa agactgaagt ctttatacca ctngcatata 180
ttgttcctga tcctgcgtgt acatttcaga gaactggtga ataaactctc cgctccatgc 240
ctttctgctc agagaggtta catcttatat tctccaaatt taaattaaaa tgtagcttcc 300
ttc 303

<210> 388
<211> 442
<212> DNA
<213> Homo sapiens

<400> 388

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ctcaaacctg tgactggtgc atgttcgcca ttagacacac tggctggtga ccagcagccc 120
cacctacaga attccctgga atgaggaatg gcattcctga gaccactcag cagagactac 180
ctcaaaaggc gctgctcaat gccaggaaat gcagcgagag aaaatcccct tccggtgcca 240
cctctgtggc cagcacacag gtcccctgct cagcgggtgt gtgtagacgt gccctcagga 300
agctcagccc aaggccctct ggaagtggcc acagctggac cacacggaac tcatccactg 360
cttctttgga gctccaggaa agcgccagaa gangggcact gaggcagang gaaagctaag 420
cagcctgtgg ctcaaaacat ac 442

<210> 389
<211> 111
<212> DNA
<213> Homo sapiens

<400> 389
gtgaacattc ctgaggaact gaaatatgaa atctgtcaag tcacatacag agatcctgta 60
gatcattcaa ctgcccatcc caaatcatcc aataaaatat gatgcttctc t 111

<210> 390
<211> 447
<212> DNA
<213> Homo sapiens

<400> 390
gcatactaat aagcccaggg aagaagagtc agacccagtg ccagcgcagg ggaaacgcat 60
ctaatccaga acagcagaca cagctcctct cccatggaac acccagagca gacattgcca 120
gtcgatccca gcaccctttc cccgggagcc tgggctcagc ctcaagactt tgcctccgct 180
tcacaaagct ctgcacagcc agttctcatc aattggagtt ggtccaaaat atggaaactc 240
tttgctctgc ctgacccaaa ccattcctct ttcccataac aattctgaca tttaaaaaca 300
gcagaattcc ccaacactca tccccgggaa aagaaatttg gcattgttgg tactttcaac 360
tcctgaccct ggtcaagctg ttgagtcaac ttgtggttga gtctgagccc catttctgca 420
gacagaaaga ccgcatttgc gttttg 447

<210> 391
<211> 336
<212> DNA
<213> Homo sapiens

<400> 391
agttagactg gctgagcaac ccaagctttt gtgttggatc cataacgtcc ctgagccaac 60
aaactgaagc agctccagcc catgtttctg aagggttacc gctgacaagt ggcaagtaca 120
tgacacagtt agtgcctgta attaggccaa gagggaaatg gcatcattgt gattctcgag 180
taactttact agcctcatta gtaaccttta gaacatcata attcaggagt catctgaaat 240
cagagtcttc agatgaaagt gacactaaca aaaagctcaa acaaacaagt agaaaaaaga 300
agaaagagaa aaagaaaaaa agggagcatc agcatc 336

<210> 392

<211> 76
<212> DNA
<213> Homo sapiens

<400> 392
taaccagtga ggaactgagg tctcccagca accacctgtg tgaagttgga agcggcgctc 60
tctctctctc tctctc 76

<210> 393
<211> 443
<212> DNA
<213> Homo sapiens

<400> 393
gggtcctcac tcagaatgcc ctccctctaa caaggagata attggagaca cagccggctc 60
tgggcctgct ctgagttgaa agaggcacca aggaaccttc aacttcatcc tcaccctcag 120
gaaatgggaa ttgttcttcc ccagttctca aagaggagaa gcagcccttc ctagctggga 180
catgatatta tgttcatcac taggacctgg gccctgtgtc cagctctgcc attagacctt 240
aacctctgtg ctccacatat gtccaacgag catgagatta tccaccccat tatgcatagg 300
atgtgcagta ggcagaattc taagatcgcc ccatgacctc tgccccctgg tgttactgct 360
atgattatgt tatgttccat tgcaaaaggg attttgcttt tgcccatgta attaccgtta 420
ttaatcagtt gaacttaaaa ttt 443

<210> 394
<211> 439
<212> DNA
<213> Homo sapiens

<400> 394
cttttcattt aatcttgtac ctaatatggg acgctggcag cggcagagag ccagaccgac 60
cttctaaaac caagactaca gaccacacac atagccttga agatccgtga acttctttat 120
aaagggtgaa gtttcatcaa actaaggaat gaagggaaag gaaagaataa agaaagaaca 180
atgctttttg ttttccgagt attctttttg ttcactacaa ggtggcaatc agatatctgt 240
agcaagcttg gatcagtgac gtctgagata cctgtttatg gattattcat ctgttctaca 300
taatgacatc tccacctcca gacaaaaatt tcatagtatg attgtagatt cactgtgctc 360
ttatctgtat gcagaagaat gggaattggg acccttgcca cacacttgtg aaaggaaaat 420
aaatctttgg ggtcccaaa 439

<210> 395
<211> 446
<212> DNA
<213> Homo sapiens

<400> 395
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aaaaaacagt aagtgaagaa atgacagagg tgccaaagcc aggtgaagtg aagaggtatc 120
atgaggcaga agtgtcttcc tactctgagc gggatcccag gaccagcagc atcagcattc 180

cctgagcctc atcccagacc gacagaatct gcatctgcat gtaaaaaaga ttcccgggta 240
atttgcaagg atattgaagt ttgagatgct gtggtggtgt ggtttaaagc ttgaggtctg 300
gaattagaag gcccatttca agtatctgtg cctctcatta gctatgtggc cttgtacaag 360
ttattattat ttccacccct aataggtaga gatgaatcta tgctaaacac ttagaaaatg 420
cctggcaaat aatactatca ttcttt 446

<210> 396
<211> 221
<212> DNA
<213> Homo sapiens

<400> 396
aagaggaaac tgaggctaag agattgaggc actcatccac tggcaagtcc cagcccagca 60
ggactgcaga ggatcaagac ttataagaaa accttcctaa caccagtgcc tgccttgttt 120
ttccagcgca aatcatactc aggaagacaa acatccaacg tcatcctctg cttcttgggc 180
ccggaagaat gttataaaaa taagtaactc atgaagaaaa c 221

<210> 397
<211> 402
<212> DNA
<213> Homo sapiens

<400> 397
gcctgcacta tgtactgcta agtcaatttg tggatttaag tagcaggtca attctatcaa 60
atgctgctgg gtcactgaat aaattgagga caatggcgac aggaaagcta cctctgacct 120
tgacaaagca gtttcaatgg agtagggtcc atgagcagac gagcagatga acagatgtac 180
agaagagcag agaggcagag aagcagctca gcagagaagg agagaagaga agagtctgaa 240
cgtcgagagg agttcagctg gagacagcca gagaggaggt cagctgtgga acagccaaac 300
tccagaggaa gatcatcttc ccactccatc ccctttccag ttccccaccc gtcccattaa 360
gagccaactc catcatccaa taaaatcccc atattcacta tc 402

<210> 398
<211> 437
<212> DNA
<213> Homo sapiens

<400> 398
ctatgaccac gaaggccgcc tgaccaacgt gacgcgcccc acggggggtgg taaccagtct 60
gcaccgggaa atggagaaat ctattaccat tgacattgag aactccaacc gtgatgatga 120
cgtcactgtc atcaccaacc tctcttcagt agaggcctcc tacacagtgg tacaagatca 180
agttcggaac agctaccagc tctgtaataa tggtaccctg agggtgatgt atgctaatgg 240
gatgggtatc agcttccaca gcgagcccca tgtcctagcg ggcaccatca cccccaccat 300
tggacgctgc aacatctccc tgcctatgga gaatggctta aactccattg agtggcgcct 360
aagaaaggaa cagattaaag gcaaagtcac catctttggc aggaagctcc gggtttaaga 420
atgatggtgg gccttcc 437

<210> 399

<211> 132
<212> DNA
<213> Homo sapiens

<400> 399
acatgatatc tggagatgca agaatgcaac aaccatcttg ccaccaaaag aagaaaaaga 60
tgagaacaaa agtccaagtg ctaaggatgc ccttttcacg ttctgtgaat taagaagaaa 120
agaaaagaaa ag 132

<210> 400
<211> 260
<212> DNA
<213> Homo sapiens

<400> 400
gccctgggaa gattacgtag ccaacactgg tgtgaaaatc atgcctatgg agggttcttt 60
tggaacccag aagaaacaga taaaggaggt gtttattcat gaaaccagca cttagaagac 120
tgcatcagca gttccagctc catgattaca agctcctcga agacatggac cagatcacac 180
ctctcctgtg tggctaaggc caactgcaca tgtagaacgg tgttccttct atgcttggga 240
caaataaatc tcacaaaatc 260

<210> 401
<211> 292
<212> DNA
<213> Homo sapiens

<400> 401
cacagaaaag ttaagactct tcagtgggac ctgctctggc cagtgaaatg gaaaagaaag 60
tgacatgtat cacctctagt ggaaactcta agagccagtg caccatttac cgaattttat 120
ttcctgcctt ggcaattgtg gatgaatttc catcagccta agtacctgag caagcccttc 180
tacagacctc tactagacat gtagcataaa ggagaagcaa acttttgtta tattgagtga 240
gacgtatcat ccattctaat aaaaaaatca taataaaacc ttctaaaaga tc 292

<210> 402
<211> 194
<212> DNA
<213> Homo sapiens

<400> 402
gacagcactt ggtggtgtta cattgatagc ctgaaatcag ccatcgtgag agtatttaca 60
ctacaaatca acaaacatta tacatcagag gttttattga tttgttgact gtctagacca 120
gggatgagca aactacaagc aaatctggct taccacctgt ttttgtaaat aaagttttat 180
tggaacacag ccac 194

<210> 403
<211> 294
<212> DNA

<213> Homo sapiens

<400> 403
acaagatatt gctgagatgt tgcccagatt ggtctcaagc tcccaagttc aagcaatcct 60
ctgaatcctc tggcctcagc cttccaagta actgagatta caggcatgtg tcatggtgcc 120
caatttatca atgcgatgtg tctacaagtg gagtggcaca ttcaaatatt tgttgctgtt 180
gtcatttgtc cattcatttg ttgactcagt agcattaact gagtgtctat tccaatgtgc 240
agacactatg ccaggtgctc gggtggaagg aggaataaaa ataatggtca taat 294

<210> 404
<211> 347
<212> DNA
<213> Homo sapiens

<400> 404
gtttcttttt attgaagctt gaagctcaag ttcatggctt catcaaaaga cgcttcaaat 60
cctgaagttg agatagctct cacctggagc ccgtgtgttg ttctaccctt tggctgggaa 120
cacagtcacc tgggaatcat tccagcaggt ggcttcaaaa gtccaacctg ctaggttgaa 180
atctgacact gacacagact ccgggagctg ccgcggaaag ctcaaccagg aacccggaaa 240
tgcacaagcc tcttgatgca taaaaacagc tgggctccct tggagacaga gcgccatggg 300
aaaccgggtc tgctgcggag gaagctggag ctgccatcaa cttttcc 347

<210> 405
<211> 428
<212> DNA
<213> Homo sapiens

<400> 405
ccaaaggaag catatacccc tggcaaaact gaccagcacc tgaacactgc cccaacagag 60
aactcaccag aagacccttg agtcgggaat tccttcctgt gggtagaact tggtataaac 120
aagtaagcca agcaaggaac ttacaccaca gcccagttaa caacaggatg cccatgagaa 180
cccctgaccc gactcagctc cctaaccctg tccacaaatg gcccgggctc tgtgccaatg 240
actaatctcc aaagtattca gtgaagcgtc tgctccattc gggatttttt cagatgggca 300
ttttggtttc atcaagccct gctttctccc gctccgtgac tttgcatcag ttgtcatgag 360
gatgattaaa taatttagca cttaaccccc tgctgtactc cttggcctgg atcatgacca 420
caccgaaa 428

<210> 406
<211> 299
<212> DNA
<213> Homo sapiens

<400> 406
cctgcattaa acgagactga gggtnagcca gctctccagg gatctctcag ccngggcgga 60
cagaaatgga tacccaatgt tacttgcttg gccccctgac ctgatgggag tatgacctac 120
tgggcagagc tcagctcagc taccccaaga agtaaacagc acagagggaa agataaacct 180
tccaggcttt ccgaaagcaa ttatcatgtg tggttatcga aaatttgtat tcactatccc 240

gggggaagga agcagagata caaataaacc cagaattgat atttgcctgg ggataaatt 299

<210> 407
<211> 418
<212> DNA
<213> Homo sapiens

<400> 407
atgataacaa aggctcaaga agattaagga atcggcagat gtgggatgtg caatttccct 60
atggctcggt agatgatcaa gttaaacagg cacgctatta tgaaaaacca ccaataaaat 120
gggagaaaga cataactgct gctgtatgtg gagactgcac ctcagcctta atttgacttg 180
ccgagcaaga acaaatggac agcacaccgg gtgcttgttt agttaccgcg gcacatgatt 240
atgaggtttc cagaaggcat cttcttcaca tgtgagatca ctcagacttc agcacttggc 300
aatcagatac aaacatgtgc aagttgaact agaaattgtt tgaaaaagct aatgatcttg 360
ctctagattt ttttttaa tnaaaaaact ttntgngtcc aacngaaatg gaataaat 418

<210> 408
<211> 435
<212> DNA
<213> Homo sapiens

<400> 408
gtccgccaac catccccga tccggccgtg tttaactttc tttgccagtc gtgatacccc 60
gtcagatttc tggcgctgcc acgccgcccg cctgggctcc ttctgggctc ttatcaacct 120
ctcccagtca gtctggcccg ccacagctgt tccaggccct cagcccctca ctttatctgc 180
tcgcacagac ctcggcctgg caagcggtgg gctcggcgcc tgctccacat accccaggaa 240
gccagctggg aacacagccg ccctgctccc ggaccctctg agagttcatt accagccagg 300
gtaccccagc ccgtcagcca aggtgcgggc cgcgctgccg agcccggccg ncggagccgc 360
ctggatcatt aaaactncac cctnttgaga gaaaaaagaa aaaaaccccc ncttttaatt 420
ntaaaaggct ttggg 435

<210> 409
<211> 399
<212> DNA
<213> Homo sapiens

<400> 409
agtaatgtgc ctagaaggag acagtgcatc gaagcaagtt tactctcagc atgtcaagaa 60
aacattaaaa tattatttgc ctgatgattg cattggacac attttgtgaa atacatgagt 120
ccctcctacc tgggatgtca agagactgct cttttgctgg gagaatggac tgatcttttg 180
catcagctca acgctgcttt tggggagcca ttttggatac aatatatgta ttgcttcctt 240
taaatgggaa ataaccatgg tctgtcaaca aataatcttg tttgataaat ctgacccaga 300
tggtgtgcta ggttgcaaaa ccgtcttctt ctgctttgga aaaactcagc tctgtccctt 360
catcccttcc tctgccacca gcctctgtcc acccccaag 399

<210> 410
<211> 79

<212> DNA
<213> Homo sapiens

<400> 410
aaaaagtctc cctctggagg acaccaaact gtcacgngcc cgcttctatn actccctanc 60
cagnanggta aggtcagcc 79

<210> 411
<211> 393
<212> DNA
<213> Homo sapiens

<400> 411
gaaggcataa aacggattca cgtataaagt tattgcctcc ctgagttcct ggtgctgtgt 60
taagtgctgg aagtatgaag gcaaatggaa gtgagatttg ttcctgtcct gcaagaactg 120
tgagccagga aagtagctta gaagtgacca atatgtcaag gtcccatgag aagactgaaa 180
aaaagagaag aaagaggaaa gaaaagaatg acaagaaaga gaaagaaaga aaccaatatg 240
ctctttgttc tttgcttttg cttcctcaag cttttctctg tctacaaagc caacctctcc 300
tgctcagctc atcagaacat tcactccact ttctggaatg aggtgttgcc tgatcctaga 360
agtcgcaata aagcccactg agatcgtaaa act 393

<210> 412
<211> 325
<212> DNA
<213> Homo sapiens

<400> 412
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gctgaaaaat ttctattgcc tggtgacatc atagtcattg taacaggtgt tggtgtaaag 180
acagacctac agatgaatga aacagaacaa aaaatcccca aatagaaccg taaatgtatg 240
ccaattgatt tttgacaatg gtgtgagggc aattcatgga agatatgtat aagaaaataa 300
ttaaataaac cttgctcaat ccatg 325

<210> 413
<211> 209
<212> DNA
<213> Homo sapiens

<400> 413
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tttggaggtg ctaagctaac taaatccatt ccaatggaag ccagcccaca ttgcagctgc 120
tgaagaagct accctgactg tacccaaaca ctcaagcaaa cgctttctgg ctgactaaac 180
tgaacagtat aagaaaccag ggtgagcac 209

<210> 414
<211> 444

<212> DNA
<213> Homo sapiens

<400> 414
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gcagaggtgg agaagatccc actaaacaca caggccgctt ggaatgttgg gccatctgtc 180
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ctttctgtat acatgaagaa tttcaagacc ttccgttaag gggggcaaga gctaaagttt 360
cagcgtttac aaagaagnct cttggctgac tttgctataa cttacagcac ctgacgtttg 420
gacacctttt cttttttggg tttt 444

<210> 415
<211> 558
<212> DNA
<213> Homo sapiens

<400> 415
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cattgacaaa atgtggtggt gagacttgct cttggatgct gtcaggaagt atcatctgac 180
tgcgtttgct accctggggg agacaaacaa aacttgagtg aaggaaaatg agaactcacc 240
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atgancttg tttctgggca agttccaccc ccanctttcc ataatgnctg gctnccacct 480
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tttcttcttc ctatggaa 558

<210> 416
<211> 232
<212> DNA
<213> Homo sapiens

<400> 416
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gaacggagac ggagagaaag agagactgat ctggactcat atcgcctgga tcttgaaccc 120
tgactttttg ctgttattgt tgttctatat gacattgatc atattagtaa atttcctgtg 180
cttccatttc ctcatctgta atgtgagaat aaaaatagta atgctgcttt tg 232

<210> 417
<211> 404
<212> DNA
<213> Homo sapiens

<400> 417

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gcttcttttc cctagggaac tgtgttaggc catgatttcc ttgctggttt tttcatatgg 360
gtggtttatt ggcacacgct taaattaaat cactagttcc attc 404

<210> 418
<211> 443
<212> DNA
<213> Homo sapiens

<400> 418
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gaggctctac ttcaaggaaa cctgatccca gaaaatgcct aaaaccaaaa cagagagtat 120
gtggcacttt ttaatttttt cctggaatca gtggtcataa cccagtttac tgtttgtgtg 180
attctaaaat tctggattgt ggattgttcc ttccaaaatc tgctacttgt ttgctgcatt 240
caattggaac ttaaaataga ttttaaatcc atcctggtaa tttcagaatc attcatttcc 300
tgtccatctc gtcacttatt ggccaagttt ccagtcttaa cactgctcta ctggagtaaa 360
agggaacctn atgggtttgg ccanaggggg aatttagggc cttacagctt atgaacctat 420
agggggggng gatttataag gca 443

<210> 419
<211> 971
<212> DNA
<213> Homo sapiens

<400> 419
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actgctcacc gtagatgcac ttctcttggt atcttttgtt ggcgtgctcg tttgggacgc 180
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ttgcacctct aggacacaca catggggaca acgatttcct acaaacacca cattatcttt 300
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tccctttggg ggcnccggcc cccaaggaaa gaaaaaccca aaanccccccc cncnccccctt 960
tttttgggac c 971

<210> 420
<211> 307
<212> DNA
<213> Homo sapiens

<400> 420
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tcttgtcctg acaccacctg gctcccaggg cctntgggca gctgtggctg tgcagcccct 120
gcttttcacc tgtctcctgt cctggagtgc tcgntgcatc ttcagtgtgt tagttgcacc 180
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tgcccctaag agcagagcat ggggctagag tggcaggtag tgtttcaata aacacttgtt 300
gacttac 307

<210> 421
<211> 275
<212> DNA
<213> Homo sapiens

<400> 421
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gactggagag tgtgagaagg cagctcgggt gccagcactc caggtgccag cagacggggc 120
tccactgaag acacgatgct gcaaactgaa aacaaaacaa caacagcagt ggtctgagaa 180
gagcactgtc ctcatcattt gtattataag agtacagggt tttcccccat gagcttttta 240
gtgaccataa aagaccgttt aatactgcac agttt 275

<210> 422
<211> 440
<212> DNA
<213> Homo sapiens

<400> 422
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ctcaagacag ctatgaagca aaagtgcttc atgcacagct tccattttgt cacaaaaagt 120
tgtgtatgca agagttgaga ctgaataaaa ttaattcata cagctttgtc agggacattc 180
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gttcccctct gctgcttctg caccctcagt gcacgcatca cttangagcc naccncactt 360
tntaagcttt ttgcncatnt aacctcatac accagcctcc acaagnggcc ttgtttccat 420
ggagacagtt gcccagctga 440

<210> 423
<211> 229
<212> DNA
<213> Homo sapiens

<400> 423
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ccctaatcct aattttctga gcaccatgga agccccctgg attctaggga gaccttgagg 120
agaaagaaga ctcctgtaaa tgcctgacat tgaaattcct gcaagtctag gagcatgtga 180
actcaaaatg gaaattaatt tgatgtaata aaaataaaga agaagaatt 229

<210> 424
<211> 100
<212> DNA
<213> Homo sapiens

<400> 424
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aacctttccc tcgcattaat aaatacattt gcggcccctc 100

<210> 425
<211> 393
<212> DNA
<213> Homo sapiens

<400> 425
actgattcct gcatagccac tgaccacagc ttctggaaca acaaaagcat tgaatcatta 60
atcctgaatg tggccaatga gcaagagatg aggaaatcta cccagttcat gaccacaaag 120
caactcacca gcagctggat ggcctgggta gcttatttct ctggagagac tcttagacag 180
tgactcctga tacagagatg ctgagactgc attttgtgcc tggaggagag aattaccacg 240
tgtgatttga gagcatcagt gttcctccag aagagacatt tctaaatgct gctagtgcga 300
aaaatgagct tatgttcacg tagcccctgg gggaagaaaa acagtaatat ttaacagtac 360
attttaagaa ccaataaaat tatttttaaa atc 393

<210> 426
<211> 461
<212> DNA
<213> Homo sapiens

<400> 426
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acaccactca gctgtgcagg ctttctccct gacacaggaa accattcgca gacattacct 120
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ctgtggggaa attgctgccc aagcatcaga gcttcccact ctgcaaacac tgcaagtgtc 240
cctgacacca gcacagacta agaagtgggc atctctggct tattctggga ccaagtgcta 300
aactgcaaat ggacctcctc tctatcccaa ttcatcaggg gagaaaaatc tnggttaaaa 360
aggggngcct tnttttaagc agctgtctca tttaaggnca tccgacttgg gcagcaattt 420
tagtacttta caagccaagt atgtttgcag aaactctagc a 461

<210> 427
<211> 383
<212> DNA
<213> Homo sapiens

<400> 427
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gaggaagaac agaatcatca tgtcatcatc cagggtcctc tatctctggc aaagactggc 120
ctgatgaatg ggatcagagc tggaggcctg ggtatctttt gactgcaaga gttaggggtg 180
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caagtctaca tttcctgaaa ttctgtatca ctgtattggc aataaacacc tagagaagta 300
agaaaggagg agctcctaca aaaaaaaaaa taaaaaaagg ccagcgaggc caattcagct 360
tggacttaac caggctgaac ttg 383

<210> 428
<211> 573
<212> DNA
<213> Homo sapiens

<400> 428
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ctgagattac aggttgtgaa gattacagaa atctgggatg gcttatggga cgcttctcag 120
ccctaagtac gaaaacagca gtgaaaatgg caaccaaaac atcacgcagg actgggggtt 180
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acagatctcc ggtgccttga ctgtaaacaa aacactttan atcattgtga ggcgatgtaa 480
gcacagcctt tctgctggca gccagacttc ttaagggggg gngactgnga cttgcttact 540
tttcgagatc acaaccacca agcgacaaaa tgg 573

<210> 429
<211> 372
<212> DNA
<213> Homo sapiens

<400> 429
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tttgatgtna gagggccaaa aactccaccc tcaggtcgtt gctaacacca ccatttttgg 120
aacatgagtn ctgtggagat gtgnagaagc tccattgtgc ttatgcatgt ttctcctttc 180
ataaatatnc atgactcctc ccatatctta ttcgaatata gtatagttca tgccaacctg 240
ctnaagcang aatatcctga tcccttngct cctcccttga aatgcctagt ttgctcggct 300
tcaagantag anaangctac ngctnggcgn ngcatngtca ttaatncncn acccctgnaa 360
ggggggcaaa cc 372

<210> 430
<211> 426
<212> DNA
<213> Homo sapiens

<400> 430
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accctgtcct ggaatcctgg aaaagaggcc ctgctaggag ctgaccttgg acaaatcact 180
cccttctctg aacctcactg ttcaggggc tgagaacaga gggtccctaa ggaagagtgt 240
tgtatgagaa cagtctccgc tcttgaccca agcaaacctg gcttcaaatc tcaactcctg 300
tggctgacta gctgtatgac cttgaccttt ctcagtttcc tcatctataa agcaggatta 360
ataaaaggta cctatctaat atgactgttc tgagaataaa atgaaataaa ctacataggt 420
gatttg 426

<210> 431
<211> 349
<212> DNA
<213> Homo sapiens

<400> 431
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gaagccccgc cttgcaaatc acaaaatgta cccagcactc cctcacccag cctggattgg 120
caatggcccc acaggacaca tgggaatgat gatctttaag tctcagatgc ctcatgaata 180
aagtggatgt gatggtgcca aatctgactg aaaagtgggg aatcagctga cctttcccag 240
ggattaaagc atcacctgct gtgcaggggt tttgtgatac atgaaggcgg tagtgcatgt 300
acggtaccag gagtaacatt atgtnatttt aaataacaag ataagtgct 349

<210> 432
<211> 370
<212> DNA
<213> Homo sapiens

<400> 432
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tctgcgccat acttctacta accaactgga aaaggcatac aattgaattg cgggagagga 240
aatatgatga ccaaacttgg caagggaaaa aagttagccc tcttggtcaa cctgggcaaa 300
tggagaacat gcaagagact tacgaggatc aaattctcaa atctttcatt gaaataaatc 360
aaatgagaac 370

<210> 433
<211> 138
<212> DNA
<213> Homo sapiens

<400> 433
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gaaacaattt tactgctagg aaatatgact gtattataca caggcaatat aaaatcacaa 120
ccacaagcac atatgggc 138

<210> 434
<211> 394

<212> DNA
<213> Homo sapiens

<400> 434
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gtctcatctg tccttgccgc caagatggat tatctgcagg aacttggacc aacttcacgg 120
aaccttcctt atgttctgtt catactgccc agacctgccc tggcttccct gttgctcctg 180
aggcagaaga ggcctttgga cttactcggc cccacatctg tacagtccag agatgctggg 240
ggaattaaca ccacaaaagg ttgactttag atcaatgtga gacaagtatt tcaactatga 300
ttgtgtattt gtcagtgcct ctttgtaatt ctgtgagttt tttccttcat ttatttgata 360
acatactgta taataatgca cattttaaat tctc 394

<210> 435
<211> 463
<212> DNA
<213> Homo sapiens

<400> 435
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tgctgctact tcatttcaaa ttttcctttg aattttctat ttcctgagct gggagaaatg 120
agaggatgca ccctctccct ttctaacagg cccttctcac ttgctctgat gagtctggct 180
ctcaagtgag ctgccctgat ggagaggccc gcatgtccag aatgaagcat accttctgcc 240
aacagccatc aaggaactga atccttccta caaccacgtg ggcaacattc gaaggaaatc 300
cccccctagc caagctttga gatgactaca gcccccagtgt acacctccat tgcagtttta 360
taaaagacct gagacagagg acccagctaa gccatgggct agccaggatt tcctgaccta 420
taataactgt gaaatagaat aataaatgtt gttgttgtaa gtc 463

<210> 436
<211> 450
<212> DNA
<213> Homo sapiens

<400> 436
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gatcgcagtg cagatccaaa atcatatgct 450

<210> 437
<211> 415
<212> DNA
<213> Homo sapiens

<400> 437
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gggaaaaagg cccccaggag aggctgtgag gaaacctgaa ctgcaaaccc accacgatgt 180
cttcctggga aaggcaagtt ggtaaagaaa gatgtgaact ctatttcagg gtagtatgtt 240
tttttcattt gcttccaaga ctttgatgga atgacttgag aggaaaagtt cacaattact 300
agaaagaacc taaaaggaca tgagagatga aaccgttgca gtatttttga aataaatgtt 360
ttcctgcaag agcagagtca aaaaaaaaaa gggccggggg ggccatttca gttgg 415

<210> 438
<211> 471
<212> DNA
<213> Homo sapiens

<400> 438
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tgacaagcac gcctcccagg actcatctta aaagagagag gacaaacgcc tatttcctgc 180
tcccctactc aatccctctg cccggaacaa gaagatactg agctttcttg gaccctgtgg 240
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tgagcctatg tttatttgcc taagtagcat aacagtaatt gttccagaat gcaaaaatgt 360
acgagatgta ctctggaaat ggaaaaatac ttttcttcaa ttcaatgaac agattctgaa 420
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<210> 439
<211> 647
<212> DNA
<213> Homo sapiens

<400> 439
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agatgagaat aagaagccag gctttacagt atcatgctct ccaaagagaa ccataaactc 120
cagccaagag ccagctccag gtatgaagcc aaactggcct aggagcagat atcctgccac 180
aaagagaggc tgtgctgcca tggcggcata cccatccttg cacatataca catacccgta 240
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taaccaatag atattctctc taaaattatg ngcaaatcaa ttttttaaaa atcaaaatct 600
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<210> 440
<211> 248
<212> DNA
<213> Homo sapiens

<400> 440
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acctcctaga ccacagctgt aatcttccaa gaggaaaggt acttacagaa ttgccaaact 120
actgtgaaga caagactaaa cagtaacaaa catctacatt tgtattatta ctgtaatagc 180
tgagttgctt gctggttgaa aagtaaggga caacaatagt ttgttccaat aaagatgatc 240
taactgcc 248

<210> 441
<211> 192
<212> DNA
<213> Homo sapiens

<400> 441
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acctgggact tgaggagccc ccttcaacct ctgccaggac gcacgctgga ttagcatctg 120
ctagggctgc cgtaagaaag taccaaaaaa taagtggctt aaacaataaa atattgtctc 180
acagttaaaa ac 192

<210> 442
<211> 369
<212> DNA
<213> Homo sapiens

<400> 442
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tgaagtgatc agaggagtag cagaacagag caaggaagcc agtgtgacag agaaatgaag 120
agatcaatgc cacaaaatta aagagaacac gggggtcgct cattccaaat cccccaccag 180
gaagccccta tcaggagggg aggaggagct cctaggaact gaacttggac gcaggccact 240
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acacctggcc agacatatcg gtgctgaaca aaagtgcact gggggatgat tttaaatttc 360
ttctttatt 369

<210> 443
<211> 442
<212> DNA
<213> Homo sapiens

<400> 443
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gtgagcagga gcagtgcctg ccactatgca tggttaactg agctggagga ccctgtgctt 180
cccgcacctc acaggcggag cagcctctca ggaacccctt ccgaggcttc cacctgtggg 240
catgctgctt tctcatcact gctgctgctg acctttctcc ccagcaacta ccaaaagccc 300
ttttatccac agtctaaaca acccagaaaa ataanggacc cccccanaag gaggatgaag 360
agcagtctgt actcaatttt atgatcagta aataataaga agacaagctc ctgctgggca 420
cttagttcaa cagcagctcc tc 442

<210> 444
<211> 658
<212> DNA
<213> Homo sapiens

<400> 444
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tngggaaagg cccctttccc ttttttttt ttnnttagga aanttttaaa tngggggggaa 180
aanggccngg aaaaaaaang naccnttccc ccaaancccc aangaaaang aaaaaanttt 240
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acccgaantt antttttgca ttggaaggga caccggggaa gaagacccaa gccntggcct 360
taaaaaaaga acctggtggc tttttggcan tttgccaggc aaaaaccaag ccccattggc 420
ctggatggaa atttttggac ctgggcccctt caagaaactt tcaagccacc gccaccaagg 480
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cttgggttat tggcattctt cttggacctt ttttctttt acaccttcnt tcntggggng 600
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<210> 445
<211> 454
<212> DNA
<213> Homo sapiens

<400> 445
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tcattgatat tgtggatttt acaaattgaa gatttgtgga aactctgcat tgactctagg 120
ttccacctca tcattttaca gaagagacag acatgcaatt aagatgacct gcctggagcc 180
cacaatatta gatcatttcc tcatatagta tgaatttgac aaagttcaca gaaaatggaa 240
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cttgtgagcc catgccacca gagtcttggg tccgacacag agctgtatgg agtcttgcag 360
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tccccaatga atgtgtctgc actcaagcaa gaca 454

<210> 446
<211> 444
<212> DNA
<213> Homo sapiens

<400> 446
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tagttccgga cactgagagc tggtgccctg tggccacctc aagctggaac cctgcaagat 120
caccaagaag actgcatgcc tcgctctagc cttcctaagg gaaagtagac tcctgttttt 180
gaaagaaatt acctgatttc aagagaaaca taaaggactt tttttccctt aacattccac 240
tcgtaaaaat gaagtttgga agaacttctg caaactctga gtgttttggt caattgacct 300
tttactgtac taagcaaatc tgaagccaca aatacattgg ggaggaaggt ataccccttca 360
caaaagatcc gtcacttagc cagatctctg ntgcatgctt ctttaaataa aagccatttc 420
tgggatattt tatttattta tttt 444

<210> 447
<211> 272
<212> DNA
<213> Homo sapiens

<400> 447
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accccacaag ccaccaaaca agccctgaac cagccaccag gaggactgaa aaagctgaag 120
tcactataat ctgggatctc ctgtttcagc agcttagtct gtatcctcat caatacagtg 180
tatctaagaa acttaaaaac ctgtgcttta ctctccatag gctaagaatc atccagatag 240
tttgtttact ttttttttt agcacattac at 272

<210> 448
<211> 288
<212> DNA
<213> Homo sapiens

<400> 448
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ggagtatata tagaggtgct gctgactgga cacatgacca gatgcaccat ctcttttccc 120
cttctgtggc aaccacagag gccgcacatt acagagcata acatgaagga agcacagaag 180
cctgagtcgc tgcttgaagg agaaactccc agggggccaa ataaccagaa aattctacct 240
tggattttgc ttaaataaga aataaatctt tattgtgtta atccactg 288

<210> 449
<211> 481
<212> DNA
<213> Homo sapiens

<400> 449
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tgggtaggng gctctgctga tttttcgctg gacttccaca tttgggacga agttggctgt 120
catcaactct agaaagggtg nggccgnttt acattggctg gtttcccaca ttctcaagca 180
atagagatgc ggnttcccca tgttggcccg gctggncttt gaaancctgc ctcaggngan 240
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cccaaggang ggctcttgag anaatttcat tttcttggcc ctgctgaang aangnctacg 360
nttnatttaa agggcctgct tgtgggaaaa ccaccccccca aaagttgctg nnaacaanaa 420
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<210> 450
<211> 397
<212> DNA
<213> Homo sapiens

<400> 450
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cacagtccag tcgcaggagc tgctataaca agatgacaag gaggcaagac tgattcacta 180
ctgattaatg cctgttgatc ttcaacaatg ggccattcca acaaatgcaa gaanggaaaa 240
atcactagcc aataacatgg ggatcctatc ctataaacag aaaggaatcc catggaaaga 300
attctaattt tatctattta agcaactatt ggttactcat gcaggttcag aaacagaggg 360
gactatgagt caataaatga tgtaaagggt tatcacc 397

<210> 451
<211> 432
<212> DNA
<213> Homo sapiens

<400> 451
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nccacacttt ctagctatga gagcttggcc aagctactta attctccagc cttatatttt 120
ctcggctaaa aatatatggg gcaagtcttg tgaagatgca atgagataat ggatgggaaa 180
gccctttgtg aagtgtaaag caacacacaa atgcagaaat aacaactaac agaaggctcc 240
caactggagg atcatgtgga aaaatggaag aactgagact atcttctggc catgaacaga 300
aggagaaaag gatgctgagg acacacttca aaatctgcat atcctctggt tcctctgctt 360
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atttttgttt tg 432

<210> 452
<211> 416
<212> DNA
<213> Homo sapiens

<400> 452
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acacccccatg aagaggggcc agggcagagc tggtggggga ctttgatttt ttaatcttcc 120
agcactgaca agccatcaag tgcccaggat aacagcacct aaacccaagg ccagaagatg 180
ccatttgcct gatcaactaa aagtagatgg aaagcccaga cttagcctga ctccattcat 240
tggctactca tggctttcct tccaagactg acaaattgcg gaggttcaac ttatatgatt 300
tcctaataca attaaaatca ctcgagggag agtcctcaaa aaaaaaaagg ncccnngggc 360
ccanttannt tgggattaan cagggngaaa ttgttnaaaa gggggggcc ccccca 416

<210> 453
<211> 148
<212> DNA
<213> Homo sapiens

<400> 453
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cagttactcg catccagtgg tctagagcat gtttgattag gcaactttta gcagtcgtcc 120
tcagctgtgc atattaaaat ggctcctt 148

<210> 454

<211> 457
<212> DNA
<213> Homo sapiens

<400> 454
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cccaagcccg aaatgctccc tgccatgcct tcgaggctga ggtctgggaa gaagactcta 120
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tctaacctgt tccttgactt ggccatgatc ccaggaatgg aggaaggatc ttccttttct 240
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agttacttac ctactccgtg tctcaagttt tacttatctc taaaaggggt agagtaacag 360
cactcactgg agtggagtgn gggtatgcct cccagcctct ccttcagaac taggttactt 420
attccctcac tgcaaggagt ggtagctgcg gactgct 457

<210> 455
<211> 84
<212> DNA
<213> Homo sapiens

<400> 455
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caacatagta aacctcatcc ctac 84

<210> 456
<211> 462
<212> DNA
<213> Homo sapiens

<400> 456
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aatggaagag gatgctaatg gagggaccca ctggcaccca ctgagttggt atgaagagta 120
ttttaaactg aaacatttaa gacacagcag atacagaaag aagcctttct ggagcttccc 180
ttatttgact aaagccagag ctttcagaga gngaagctgc cataaattcc ctcttgggga 240
gcttcactgc cagtaaggag actttactgc caggaaggag accacttgca cctgaatgac 300
gaattgcata accgaacata atcacaaatt gtcgtaccat catttgtttc cctaaaagcc 360
catttgtctt tccacaaaag gatatttgct tccccataga accctttctc tcctcctccc 420
ttttcccata ttattggcat ataaattctt catccctaac tg 462

<210> 457
<211> 439
<212> DNA
<213> Homo sapiens

<400> 457
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gaactgaaat ctgtgagctt taaaccgctt gcttgaagac acggctgaca tttgtggctg 120
aatcctaatg tagttaattt tcctttcaat gggtcaactt gcaactgtta ggagtcttcg 180

aaaccttttg tgtgaatcca ggagggaaaa ttgtctggca aagtctgata agcatcgtgt 240
caagagcaca tttgtactct ggatgggagg tgaagggaag agcagcatca tctgtgcagc 300
ctggtgaaac ggtgtttacg acaggctaca ccgggcacta ctggggtatg ctgnctcctt 360
ggattgngtc atatttttaa cccagtggga aattcatagg atcctcttga ctctgtaaaa 420
actgtgggac aattcagtc 439

<210> 458
<211> 660
<212> DNA
<213> Homo sapiens

<400> 458
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tcgtccttga cggctgagtt ctgaagggag gaaggcaaga cccaaagaga cagatggaca 180
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cgagggattt actgcaactc gagggattta ctacgcaaag tgctgggcat tccaaggagg 480
catggaagct ctctgaacac canggcagta actgctctgc ccaagagaat ggggtccact 540
cttgcacctt gaaggaccag ggatgaagaa agtggttcan atgaatttct gaattagtct 600
gactangctc ttgaacctgg cgcacaataa atgnagtaaa tattgatgcc ataaataaag 660

<210> 459
<211> 233
<212> DNA
<213> Homo sapiens

<400> 459
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aaaggagagt tgggttgggg gtgcatcact ccttagctgg agatacagag aaatctatac 120
ctacaagatc ctcaaggtgt ccttgttgaa aacttcatcc aaggaactca agtactgctg 180
gatttgngtg actcatntta cgaacnaata caaaggccta ttaactattt aaa 233

<210> 460
<211> 628
<212> DNA
<213> Homo sapiens

<400> 460
ggaaaccagg aggaattcca gaatcaaaga gaaccgcatt cctctctacc acaaagtact 60
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agagcccagg cagagagcaa gtaaaagagt ctccgtggtt cctcccagcg ctagtctgtg 180
gcctcaacaa catagcacgt tgcaggaaaa attccaaatt tctgggtccc aaggggaggc 240
attactcagc agtctcagcg gtgacggcgt cagcaggaca agagccattt gctccgggag 300
gactttgatg tttctttaaa tggttnctgc atctagtcca atagaatgga tacggaatta 360

tctttattac aaccacaagg atgtgcaaat ttatttacag tataaatggt tctttccaca 420
agtcctagct gtcaacaact ctttattttc ctggagtgac ttacaagcca agaatgnttt 480
gtttcttaag cttcctacct anagaggtaa aataacaatc ttggtaatga gaagacaaag 540
aagctaactg ttctgctttg caagcgttcc tacagaccgn accttttaat tgcctagtgc 600
tggcaactta acatactgta atgagacc 628

<210> 461
<211> 317
<212> DNA
<213> Homo sapiens

<400> 461
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atgggccttc ctggttctac caccgacctg ctgggggttt cagcaagcct tcaccttcca 120
cgttggcgtt ctcagctcta agaaaaggaa gttgatttcc atgagaggtg atcaaactgt 180
gctgtagaag cctcagcgat tccacagaac attagagtac ctctgccaag cagaattctc 240
cacatggaga aacctcccct cttactgatt ttatatgcca tgcatgtcaa cgctctgggg 300
aagatttttt gcttgag 317

<210> 462
<211> 308
<212> DNA
<213> Homo sapiens

<400> 462
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gatattctgc ttctctcctg cttaaaacct tcagatctcc ctatctccct aaaagcaaca 120
accaaagtcc ttccaggggc tacatgaaca cctgcatcgt ctggagtctg ctatgactca 180
gccctcaatg cctacaatac tcatgcatta agaacatatt gagtgggtat ggaaagtctc 240
taaatcntct ggtccacgct ttagcaaaca cgtctcaata tattctactt ctacagatga 300
gtaacttc 308

<210> 463
<211> 464
<212> DNA
<213> Homo sapiens

<400> 463
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gttcaaccca acagttgttt tccactgaaa tatacaaacg attgaggaca ttgacaacat 120
agtgcctttc tagaaagatg gccatgacat cgctgtgatc actgcttaca ttccacgcta 180
cctgatttgc atcatgtaga tgtcgctgct gtgacattga tagcctgtga ctcccccagcc 240
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ntggatgaat gatctgcttg agagcccncc aaatantagt gggaggcagg ggatcagctt 420
tttttcacac cctcttgagc tgctgtaccg ngcttattct tctc 464

<210> 464
<211> 213
<212> DNA
<213> Homo sapiens

<400> 464
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cagatgttgc tcactggatt cagcacttcc atcaaaatcc ccaaaagcct ttatgcttag 120
aaatgaacag acatcaaaaa ggcagcaact gtcctcttta ctgccatttc ctcttctagg 180
gcctgtgaca tgacaaggat aatgcaggag gtt 213

<210> 465
<211> 389
<212> DNA
<213> Homo sapiens

<400> 465
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aggtgtctca gggaatgggc agccacagga ctcagacccc agaaagtgcc tcgaaccccc 120
ccagcaccaa gagagtgtgt gaaccagtgg ccccgctctg tccacacttg gaatgtctgc 180
ttaaggaaag atgtttctgg cttccagtct tccacatcct gcaggtcaaa acagcttcca 240
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aaggctccat cccactgatg gatgttggct gtgctggcag ctccgcataa tggaacactt 360
cgcttgattt ataaaggacc caacttgtc 389

<210> 466
<211> 582
<212> DNA
<213> Homo sapiens

<400> 466
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aatcccaaca tttcgtggct ctgaattaga aatggccaaa gagacatcta cctgtgtgtg 120
acctggaagg tacaggtgaa gcaggacaac tgtttctgaa gctctttaca cagtggatca 180
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<210> 467
<211> 342
<212> DNA
<213> Homo sapiens

<400> 467
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ggcaggaaat gattcgttga ataaatggat taaagggtgc ac 342

<210> 468
<211> 206
<212> DNA
<213> Homo sapiens

<400> 468
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ggaatcagcc cttccctctg tcctgttccc actcctcccc gacgatgctc ctgctcagaa 120
cccactcctc acctcagtga agcaacgcag cgggcaccct gtggacaaag ctggatattg 180
gctctgaata aaagcgaatc atgggg 206

<210> 469
<211> 926
<212> DNA
<213> Homo sapiens

<400> 469
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<210> 470
<211> 348
<212> DNA
<213> Homo sapiens

<400> 470
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cccaggacac tcacccaaca agatgcagaa tggaagcaag cgaatgaacc tagcccatat 180
tgctaaccca gagaatcatg aagaagtaac atagttgttt taggtcactg attttcatag 240
tagttggtat tgcaacaatg cgtaactaat acagcatatt attactaaat gtttaaattg 300
tacttaaata taagccaaaa taaatgggtt aatccaaaaa aaaggcca 348

<210> 471
<211> 406
<212> DNA
<213> Homo sapiens

<400> 471
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aagaagattt tggatttgtg tgtgtggcct ctgacaaaac tgtttccttt gtttctgata 120
ctccttgaaa cctcgcagtt caaaacctac ttttttggtt taagatcaag aaacggaggc 180
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gatgaggcag gtacatccgg ggcagtattg ctgtctaggc tgttgttaca ttatggtgaa 360
agactaattc caacatgaag aataaatcaa aaatttatta attatg 406

<210> 472
<211> 459
<212> DNA
<213> Homo sapiens

<400> 472
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ggaggcagca tctacatttg atgattcaat tgacccggcg gatgactaga tcgttttaaa 120
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<210> 473
<211> 435
<212> DNA
<213> Homo sapiens

<400> 473
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aggacccagc ccacatctgc caacccaccg tgtcctctgc ttcatgttta ccctgcatcc 180
ttttcactga tgccttcaaa tatccgtgtg tgcacgggaa cagtggttat gctgccaatt 240

taaagaacca aggcttcaga ggaaaggaaa ctcatgcgtg cccccaccac cgactccccg 300
gttcctgctg gttatttgta aaagttattc acaggaggaa gagaaagagc cttcgtgngn 360
gattccctgg ttacattacg ggggggtgg aaccaaggtt ctctgggcag cttcctccac 420
catctgttcg cactg 435

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<211> 238
<212> DNA
<213> Homo sapiens

<400> 474
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ccatgtattt gtctgcactg caggattttg gacaatttac cttttctc tctgccctcc 180
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<210> 475
<211> 447
<212> DNA
<213> Homo sapiens

<400> 475
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gacacaggga agccccatat attctga 447

<210> 476
<211> 452
<212> DNA
<213> Homo sapiens

<400> 476
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<210> 477

<211> 190
<212> DNA
<213> Homo sapiens

<400> 477
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gtaaaatttg 190

<210> 478
<211> 54
<212> DNA
<213> Homo sapiens

<400> 478
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<210> 479
<211> 300
<212> DNA
<213> Homo sapiens

<400> 479
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<210> 480
<211> 444
<212> DNA
<213> Homo sapiens

<400> 480
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agcaccccgg ggccagtctc ctgacgtcca ggccctgctg aaacgagtct gttctcacgg 180
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gtcaagctcc actgaaacat acactcccta atcgattgct gtctcaacaa caaaccaatg 360
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tgtcgcaaag ctgccaaagt gaca 444

<210> 481
<211> 187

<212> DNA
<213> Homo sapiens

<400> 481
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tttgatcacc aaatgagtca gggagaagaa catggatgga aatatcctca gtcaagaact 120
tcacaagcac cagttgcctt aaccaggggc tctagaaatt ttctagaata aatgcttctc 180
aatttgt 187

<210> 482
<211> 380
<212> DNA
<213> Homo sapiens

<400> 482
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gtcgtgtggc agccccatag agagttggct gggtctcagc ccagggccct gggccatttc 180
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ctagcccctt tcactgcaga agcctgctta catttatctg aaaattttaa aagtttaata 360
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<210> 483
<211> 398
<212> DNA
<213> Homo sapiens

<400> 483
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gagaagtcag aggaagatgt gcacaaagtt aaatcgctct gccctttcta ctatcagatc 180
atcaccaaac actcgtggga tcacactgag aaggatcatc caagtcaaga gctgcagaag 240
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gctacattaa tttccttctc atctgatgac ttcttgagag ctttttaatt tctgcatctc 360
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<210> 484
<211> 425
<212> DNA
<213> Homo sapiens

<400> 484
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atgactgcag tgcaaattct tatcaggaat cctccaaagg tacaaattat gtccttcaat 180
ctgttctcct ttgacatgcc cttctcctag tctgtgaagt ctgattggac tgggacctat 240

ctcccactg gaggaacctg tggggccatg agaaagttat tttttctgaa aactcagttc 300
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gggga 425

<210> 485
<211> 326
<212> DNA
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<400> 485
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ctgttggctg tccaagactg gagcatctta ggaaatggct cacctggagt aactgattga 180
ggtccagtca ggcatgtgag gacacagtgt ttgccccact ggaggacgaa ggaacaaggc 240
accatcttgg aattggagac cagagccctc acaagacact gagcctgatg ttacctttat 300
cttggacttc acagcctcta aaattg 326

<210> 486
<211> 226
<212> DNA
<213> Homo sapiens

<400> 486
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agctccagcc tcaggaaggt agcatgtgag gacaggtgtg gctagttatc atcccgacgc 180
ctggttaagg cataataaaa atcagatgct gttggcctcc catcgg 226

<210> 487
<211> 199
<212> DNA
<213> Homo sapiens

<400> 487
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aaaaaatgct gtgtatccag cttccatcac cttgaatagg atatccgtga taagcaaatg 120
aaacagaata aacttgaata cataaagcca tgtagcattt tctgatctcc ctcaaaggag 180
tctactgaaa tactgaagc 199

<210> 488
<211> 467
<212> DNA
<213> Homo sapiens

<400> 488
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aattttattc gagtggaaaa gatgtggcca ctgcctcatc tggcccacaa aagccttcca 120
cgtggcccct cctccttccc tctgcagcca cgcacacagg atccaacgca gaactgggtg 180
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tgttcagctg ctgagattct ggagttgcct gaagtagcag tcaacttgct ttgcctattg 360
cacatataca tgctcatatt taactccaat tacttgattt aacaacactc tacaaaagat 420
gtttttgaca tgctaagaaa aaaagcaatg accaaacaag taccccca 467

<210> 489
<211> 401
<212> DNA
<213> Homo sapiens

<400> 489
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<210> 490
<211> 469
<212> DNA
<213> Homo sapiens

<400> 490
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ccaaacaagg tacctgctgg actcacttgt gtctgctgat ctttcagggc agctggggat 120
tgtgggcagt tgcacaacct ggaggctggc atcatggggt catttaggat tgaatctgaa 180
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<210> 491
<211> 304
<212> DNA
<213> Homo sapiens

<400> 491
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atgaagaacg tgcttgctct gtaacatcca aacgcgtggc caccattcac agatagtgtc 180
ctttgggaaa ggtgtgggta tagatgggga atggtcagtc ctatgaatat ggggctataa 240

gacagcaagg ctagaaagta tctgtgcttt catttttaa ttttatctat ttttttttt 300
tttt 304

<210> 492
<211> 181
<212> DNA
<213> Homo sapiens

<400> 492
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ctagatgact gcctacctcc ctatacttcc ttacaagaca aaataaactc cgtatttgtt 180
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<210> 493
<211> 158
<212> DNA
<213> Homo sapiens

<400> 493
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gccatgataa ggccatatct tgcaggaaga caatgaagac cagaaagtga gatcctaagc 120
tgatgattcc atgtagtaat gagtcaaatt aaatgatg 158

<210> 494
<211> 53
<212> DNA
<213> Homo sapiens

<400> 494
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<210> 495
<211> 493
<212> DNA
<213> Homo sapiens

<400> 495
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aggcagagtg aatggtgcaa tgaaaagttc cagaagggta aatcaganga cccatattta 480
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<211> 442
<212> DNA
<213> Homo sapiens

<400> 496
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aaagaaaaat gaagcaaagc aa 442

<210> 497
<211> 546
<212> DNA
<213> Homo sapiens

<400> 497
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aaggtt 546

<210> 498
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<212> DNA
<213> Homo sapiens

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gcnttcacaa tggtttttcc ttnttacacc cttaaatcct tccnccttta ngttcaaaaa 540

anttcacntt ttttanaata aaaaacttcc t 571

<210> 499
<211> 509
<212> DNA
<213> Homo sapiens

<400> 499
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tgggttgnaa gncagactgg gaagacaat 509

<210> 500
<211> 475
<212> DNA
<213> Homo sapiens

<400> 500
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ccatcatctt ttntgccccc tncagtaatt tactaacaga gatggagggg accca 475

<210> 501
<211> 511
<212> DNA
<213> Homo sapiens

<400> 501
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aacccttgtt tgccaanttc attttctaaa a 511

<210> 502
<211> 506
<212> DNA
<213> Homo sapiens

<400> 502
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gaccacattt ttattatctg attcctattt gaccatctga tgtgcaaatt ttacctatca 420
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aaggaatctc aagttttact gatcta 506

<210> 503
<211> 499
<212> DNA
<213> Homo sapiens

<400> 503
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cccagcgacg nttcanatca gaggagaaaa atctgtccca accttatccg tttggangca 480
ggggggaagg ggtcttttg 499

<210> 504
<211> 471
<212> DNA
<213> Homo sapiens

<400> 504
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ataagaaagt gttattggct gggcaccgtg gctcacgcct ataatcccac acttttggaa 420

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<210> 505
<211> 499
<212> DNA
<213> Homo sapiens

<400> 505
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<211> 375
<212> DNA
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<212> DNA
<213> Homo sapiens

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<211> 491
<212> DNA
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<212> DNA
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<211> 449
<212> DNA
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<210> 512
<211> 451
<212> DNA
<213> Homo sapiens

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tccttgtgtc aaccactgaa gggaaaaact g 451

<210> 513
<211> 198
<212> DNA
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aacaaaggaa atgaactcaa atccctaacc tgcggggcgt tccagcaacc ctgaggccaa 180
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<210> 514
<211> 461
<212> DNA
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<400> 514
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<210> 515
<211> 658
<212> DNA
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<400> 515
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<210> 516
<211> 260
<212> DNA
<213> Homo sapiens

<400> 516
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ataaaactct ctcctgcaat 260

<210> 517
<211> 436
<212> DNA
<213> Homo sapiens

<400> 517
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gtatccagct tagatg 436

<210> 518
<211> 452
<212> DNA
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<400> 518
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<211> 290
<212> DNA
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<400> 519
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ctttattgct tctctaattt tttcaaaaca aaacttaact actgtaacga aactattcag 180
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ncnnttnanc tnggncttan cnaggnngaa cttgttcaaa agggggggg 290

<210> 520
<211> 577
<212> DNA
<213> Homo sapiens

<400> 520
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aaaatnaaaa ccctcttttt ttntttttat taaaatt 577

<210> 521
<211> 664
<212> DNA
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<400> 521
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atgg 664

<210> 522
<211> 451
<212> DNA
<213> Homo sapiens

<400> 522
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atgtttcccc aaagcttata aacattggtg g 451

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<211> 666
<212> DNA
<213> Homo sapiens

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agaaaccccc aagacanggg gacntcttga cttcaagcct tnccacgcca ggaacaacca 660
agccaa 666

<210> 524
<211> 580
<212> DNA
<213> Homo sapiens

<400> 524
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<210> 525
<211> 519
<212> DNA
<213> Homo sapiens

<400> 525
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<210> 526
<211> 364
<212> DNA
<213> Homo sapiens

<400> 526
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agac 364

<210> 527
<211> 304
<212> DNA
<213> Homo sapiens

<400> 527
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<210> 528
<211> 447
<212> DNA
<213> Homo sapiens

<400> 528
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<210> 529
<211> 450
<212> DNA
<213> Homo sapiens

<400> 529
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<211> 248
<212> DNA
<213> Homo sapiens

<400> 530
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gggggggg 248

<210> 531
<211> 356
<212> DNA
<213> Homo sapiens

<400> 531
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<210> 532
<211> 455
<212> DNA
<213> Homo sapiens

<400> 532
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<210> 533
<211> 456

<212> DNA
<213> Homo sapiens

<400> 533
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cacttggaca gacttttgtc acaaaatact nggntnggtn ttaaagggcc ccaaacanac 360
cttgntccca gggccattgg nttgttattg gaagcccatt ggaattcttc ctaaagataa 420
tttattatgc tccgtcaaat catccatact tgaaaa 456

<210> 534
<211> 444
<212> DNA
<213> Homo sapiens

<400> 534
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tcctgcccaa gaagtggcag gaagactcct ctccctgctc acacaggctc ccaacatcac 120
tcccaggaaa acaagtgcca tctccccaca agactgtgag ctctgagcac agcagagact 180
ttgtcagttc tgttcctgga tgttcaccag cacatggcag caaatcctga gagctggctg 240
cagtcagact cttctacctg acccaggagt gaccggggca cagagctgat tccagagaag 300
tctcctctaa aacaaggnat gggaaccact tttttaaccg gcnttgtttg ccttttacag 360
ttgaggcact aaattcatgc atgagcggcc tgggttcaaa ccctcactct tgccacttct 420
tggctgagtg acctagaacc aagc 444

<210> 535
<211> 502
<212> DNA
<213> Homo sapiens

<400> 535
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nanccnntcc naaagtcctn ggaattttgg cccanggttt tttgatggac tccttcccaa 120
attttttaag tttaccggct ggaaaactgg atggctggcc cgatcggcct tcgggaaagc 180
cccggtaaga accatcacgg gatgccgaag cttttaaggt aactcttcac agtgggangg 240
acanggaatg ccaggccntn tgaagcccaa agcttaaagc catcatattc ccggggacct 300
gcacacattc aagatgggcc ggntcctggc cttaactgat gacatttcca nccccaaaaa 360
gaaatggaaa atgggcctgg ttcctggcct taactggagg acattatttt ggngaaaatt 420
ncnttttcct gggtcatcct gggcccaaaa gcttccccta attgagcacc cttgggaacc 480
cccaattctt ggctggccaa aa 502

<210> 536
<211> 448
<212> DNA

<213> Homo sapiens

<400> 536
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gctaaaattt tcaatagatt gctgaagggc caactatgta ctagcatgag aaaatagaat 120
ccctggaact gcagacacag aggggttcac agccactctt ttccaagaac ctctctatgt 180
gctcacagag aaagagtggg ggcaggacta gggtacaggg aaagctaccc tcaattctac 240
aggagggagc agatgctact aatggaaagg cagagagctc ttcaaaatta cttgtccctt 300
aaaagaacaa aagctttaaa ttgctgggga aagaagnacc atacactgtc atgctggggg 360
gcatctgtat cttgaggaaa atgttaaaga atgaaagact tcacccctgc agaagaacag 420
taagtgatcc tagacctgga ctatcaga 448

<210> 537
<211> 489
<212> DNA
<213> Homo sapiens

<400> 537
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ggatttccgg aagaatcaan gggcagctgc aatgactctc ccgccccggta ttattggcat 120
tggcagcact tattggcagc tggcagaacc cagaatgaat ccacagggaa tgcctggtag 180
tanccaaatc aagtaccaaa caaaatcccc gaaatggttc aaaccagaca gcttcgactt 240
ttgggcacat gtgtatgctg ggagcaccca gtttctagtc ccagaatacn ccaaaaaaat 300
aggaaaacct atgtgctatg ggctttgata gggaatgcca gtaattagtg gncctggtct 360
tcaaaatcat tggggatgta aaanactgca accanaattg ctttntgagt aacctgaggc 420
ataaaanagc tgctgatata agtcaaagct tgcctctttt tggngggccn ccaacatctg 480
gtattttta 489

<210> 538
<211> 315
<212> DNA
<213> Homo sapiens

<400> 538
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ttaatcagaa ggaattactg aggagagtta gaaaggcgat gtgctcaata caaaaccggg 120
actgggatga gtatcaagtt actgcaactc gcttccgccc agaacaacaa acgaaggtgt 180
gtagttggga atgagactct caccagtgct ctctgctgaa gtttccggtg catacctccc 240
acggctactt tatttactgc agctggccaa agttttatag cctgtttcat gtattaaaat 300
tcaaatgtgg aaaac 315

<210> 539
<211> 307
<212> DNA
<213> Homo sapiens

<400> 539

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ggttccattg atccaaaagc ccattgaagt caataggatt tcgtctttag cagaaatgct 120
gcacttagat tatctccata ggaaagtaca gaaaaaaaaa actgatcgaa atagctgagt 180
tactttcaaa ccaccagcct gctttatttt taaacatatt agaagtttca ctaatcttta 240
aagnggattt tgtncactga gagtaatact tataataata atataatgca ttaaagaaga 300
gaaaact 307

<210> 540
<211> 442
<212> DNA
<213> Homo sapiens

<400> 540
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ctcactgtgt tgcctaggct ggtcttgaac tcctgcattc aagcgatctt cctgtcttgg 120
ccttccaaag cactaggatt acagatgata caggttaaga ttaagctgtt tctttcatgt 180
gagtctcatc actgagatct gattccacct acaaaggttg cctctagggc tttagattga 240
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cagtgtggct gtagttggag ataaaacttt tttaanggan ggtaatcaag cttaaatgaa 360
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atcaagagtg cacatgcaca at 442

<210> 541
<211> 469
<212> DNA
<213> Homo sapiens

<400> 541
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aatagaaccc acacaagttc aaacgtcaca ttcaagtaac aagatgttta gctgggcaca 120
tggccactca aaatgaagac ttcattcttg gcctgccttg caggaagata tggccacgtg 180
actgagatct ggcctatgga atgtgaatag aaatatattg cacctccccc tttcttcttc 240
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gtgtccccaa ggaatttttt gagcaacgct atcatgtcac tcctggattg actgcctaca 420
agacattttt aaatgtgaga taaataaacc ttcatatttt taatcaaaa 469

<210> 542
<211> 470
<212> DNA
<213> Homo sapiens

<400> 542
ctacttccta cagggtgagc ccaggacacc aggacagagc tgctgccacc tgcccatgtc 60
ttccaaaagc gacattttga gctcattact actagatgtc acaatacaga atagggtata 120
cgtcgtagcc ggctctcagt cccaaaagca gggtatggcc atgcaggaaa taaaggttac 180
agagtgctga cattatgctg atgacatgct gtcttcaccc aaaaaagatg cagcaaagtc 240

taaaactgga aagagctttg gagatcacca acttaacatc tttggtattt taaagacgga 300
tgaataggtc aaggtgagaa atgagttctc cagtgtcatc cagccctttg atatcacagg 360
cagagatgga actactcctt cccaacccta taataataaa aatagtctac tctcctcatc 420
ccacacccctt tcctgatata tcctatgcaa atgcacagaa gatactttgg 470

<210> 543
<211> 459
<212> DNA
<213> Homo sapiens

<400> 543
gtttatgagc aggaaccatt gcttaagaaa tactcaccat caagcagaat catgagggac 60
agagcaccat gaactcaggg agcaaagaga acactgtggg ggtattctta gggatggaat 120
ctccacatca aatccattgg caagacctgg atgttcttgg aaatgtgaaa cattgaaaat 180
gttgaacatt aatcttctcc tcatctccag tatcaacacc caactgaggc caccatcatt 240
tcttgggttt gggtggacaa ttgcaacagc cacctatgac tgctgtgact ttgtctatga 300
ctccagttaa tccatcctcc actccaccgc ctgaatgatc tcttcaaaat tcacagtagg 360
taatgacacc ccagtggaaa atgctgattg ccttctactt agaataaatc ccaaattctt 420
tactgtggcc tataaaaccc tcagtgcaat cctcaaaga 459

<210> 544
<211> 479
<212> DNA
<213> Homo sapiens

<400> 544
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agagtaaagt gttctagaga ttaatgggct tgctgtttgg caaggtccat agacgtcctt 120
tcctgccaat acaaatatat atattgttga agcacaagac tatatccaca gataggatta 180
catgttaact gaaaagattc aaggaagaga agatgggcca tcaatgaaaa atggtggtta 240
caatgaagca actgatttca cagctaaggc gagagcactg cacttcctcc tcatgctttc 300
tggttgntaa actcccacta agaagcatga aaaagagcaa gatgcacttg aggagataaa 360
gcagaccttt gaagggaaac caaacatcag ttcaagttgt aacttagaga ccagaaaaga 420
tattccaagt ttttgtgaag nttaaaatgt gctcttttgt atggaaaaaa taaatcctg 479

<210> 545
<211> 408
<212> DNA
<213> Homo sapiens

<400> 545
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ttaacatgga acacaacaga gctggacgtc tgagccctaa ggacggcttt tgggatctca 120
aatccagcta tgcctgaaga cctaaagcta gaagctcctg tgcttttcag ttacagccag 180
taaatcctct tttttggcttt aagccagttt gaattgggtt tctacacagc ctgaaactgc 240
tatgaagtca aaggtagtgt tagtgctgga agacactgca tggataacct cctcaagggg 300
ccacttcact ttcaccacca aatgcccctt ttcaccgatc cttgtctact gctaccttgt 360

ttgatagatt atgtctacca aaaataaaca aaacccgcat tgagaatc 408

<210> 546
<211> 422
<212> DNA
<213> Homo sapiens

<400> 546
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atctattctt gactttttaa ctgatggatc acattataat gcagaaggtt ccttgccctg 120
atgctgaaaa cagacttgcg aagctgaaaa tgataagagt atgactttta gttttggaat 180
gttaagaaat aatatactgt caaatcattc aatagatgac attgttaaaa catgaaacat 240
gaatatgttt cgctaaagca tcatcgtaca attgacaatt cttgtctatt tttactttta 300
tttgggcagc accatgaaca aacttgtggg gccccacgtc ccagccacgg atggtgcatt 360
ggctgtgcct cactctgata atggccttcg tctgaatgaa attttcagtt tccaaagact 420
tt 422

<210> 547
<211> 322
<212> DNA
<213> Homo sapiens

<400> 547
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gagcgaaact ncgtcttaaa aacaaanaag ctgncatttg gccccanatt tgngccttga 120
aaccaccacc gggagggcgg ttcccacaag cttcccgggt tgggggctga ccaattctgc 180
caggaaaact agggcgacat tcccaaatca tcccсttgac agccctaatt cttactttta 240
agaaggntct tggtaccatg gaaaaccgca aatgcccggt aaaggcagat ttaccatgaa 300
agctaataaa gcttctaacc tc 322

<210> 548
<211> 406
<212> DNA
<213> Homo sapiens

<400> 548
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cttggggaac ccactgggaa gagatgggaa ttagaaagaa gaaggggtcc cgaaccagac 120
agggacctca agggcagaaa accaattatg gtcaattaac ttcttcaact cagcaaatat 180
ttttcaaatg gtcaagcaca tggaaaggag ccatatgaat gacacaaaca tgactggaaa 240
cctctgtctg cctcccagag cttcgattcc tgcactgggg tctttcaaac tcaggtacca 300
aatggcttcc tccgagggga aaaactaagt cctgccagat gcccctgggt acattacttt 360
ggggtccatt cttaaattta aattaaacta cttttatccc actatt 406

<210> 549
<211> 422
<212> DNA

<213> Homo sapiens

<400> 549
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ccatatgagc ttggaggcag atcctgctcc aattgagact cagctgagac tgcagcccca 120
gttgacacct tgattgcagc ttcataagat cctgaatcag ggaatccatc tcagctgtgc 180
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cagctggtga agaccacaag agactgtctc cagtgggaaa gagccttgag ggagctcatt 300
tactgcttcc acatgtgtgg tcacagaaag aggcatcatc tatgaacaag aattcaggcc 360
ctcaccagac atcaaatctg ctggtttctt gaccttggac ttcccaacct ctggagctgt 420
ga 422

<210> 550
<211> 330
<212> DNA
<213> Homo sapiens

<400> 550
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gtcagcaatg gggggnggaa aaccgaacgc ccttcggggg aaagggaggg tcaccccaag 120
atcttcaagt tcaccgaagt ggcagcctgg gattcaaggt ccctgcctgc cttccagaac 180
ctgagctctg aaacgctgga ctaatcaaga acctcttggc ccttgaaaaa tgaggcctat 240
tgaacaaaga catttgtaag aaaagggact attacaacct agtgtaaagt aacaagcaaa 300
taaaaaatga aatggcacaa ctcctcccac 330

<210> 551
<211> 459
<212> DNA
<213> Homo sapiens

<400> 551
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gccgacatcg agtatcggga gatgaaggga aatgaagaga cagcaactac ccgaagccct 120
gacggcatcg ctgggctgtc aatcaaccct ctcacttctc taacttgcaa cttacttcac 180
gggatgtttt tccctattta agccattttg agcagggtaa tctgttatat gtggttgaga 240
gcagccaact gctatactag tctagagagc taaacccagg caccccctta acaatcgtca 300
gtcagagtgg gtcaggacaa taagcacaac ctgcttttcc agactccttt gtcctcctcc 360
ctgaatgctg aagaaacaac cttcccttct ggtcttcatc acacttctac acacccatct 420
gcactaattc cactgtgctg ngatctgctt tgtatacat 459

<210> 552
<211> 472
<212> DNA
<213> Homo sapiens

<400> 552
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tttccacaag tacttccttg ccaagaaggc cgaacaaagg ttcaaacctg aagttaaagg 120
gggggaaaaa tgaaagggaa actttcttgc accaaaggga agcttgcccc aagctttttg 180
tgggggggaa gaaaaagtgg gatgaaggga gggggcttga aagaaagcct gatgggcagc 240
cctgggatga agaaacaagt gacccaagcc aggtgggacc ttccagggaa gtatgcctgn 300
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gacccttgaa acaaaactct tgactttctg ccatggatct ctttggggcc cangactggt 420
ggatgccttt gaagttttgt attcaataaa actttttttg gctggtgata at 472

<210> 553
<211> 440
<212> DNA
<213> Homo sapiens

<400> 553
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ccgacacagg cttgctatga agaagaagaa attttgctca gaggaaacta gaaaacctga 120
acgtgtacac aatgctgaca tattttgttg ctttcacccc tcttaagaat ttctaccatt 180
cctttgagaa gttgattatt tttaaaactg tgtatcattt tgccttcttg ggcaaattgc 240
acagtcaatg atatgtttca ccgagtatgt aaatcccttt tacatatttc aaaataatat 300
ctaattaaaa tgtcaaggtt atagctcatg aggctagagt ggacagggct ccaccccctc 360
cctcagcctc tcaaagtaac atttaaagta tgtcctataa ttaggagcaa ttataaattc 420
caattaaaaa gaacctgcat 440

<210> 554
<211> 516
<212> DNA
<213> Homo sapiens

<400> 554
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tacnatggga aagccnggcc cggtgccagt ggcatgcccc tggtaattca ccacaacttc 120
atggagatta aagcagggag ggaccttctt gagcccaagg aagttttgag gnttcaagtg 180
agctatgatc atgccactgc acttccaacc tgggcaacca gaagcaaaac cctgtcaatc 240
aatcaaagca agcagaccaa gcaagggaaa gcaagcagca agaagcctct gcatgagctc 300
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ggccaaaacc ttcattggga acttagaaga gaaaaactgg aaacnnccag agcttttttt 480
taagcttctg agcccacang ctggtcctac atccct 516

<210> 555
<211> 407
<212> DNA
<213> Homo sapiens

<400> 555
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ngannnaggg agnattgaan ctactntgtc cactggacct tgttcccang ctccggntga 120

agctgaacac tccgnatgat ctccctgcca ccatancang ctatgaagtt cattacacat 180
gcangtagna gacaatacag ctctgcttcc atttctgagc acctacggta agactgccat 240
tattcagtgt gccancctgt ttccaagcct acaatgtata gttcctctag tacgtaaact 300
catttttttt ctcagagagc cnagnagaga cacaggcagt tttcttttca aaatgtgcca 360
nanattccaa aacaatctca aagcattaaa ggctatgtgc acaaagt 407

<210> 556
<211> 368
<212> DNA
<213> Homo sapiens

<400> 556
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cagcaaagca gccctctgat ccatatactt tagctacaac ttacatcacc aaggtccata 120
ttatatactg tgatattcca gctgcacagc gaagaatccg tcacctgctg acaaaaacaa 180
atgatgctga gaggtttggg cacaataaag tggataatta tacacaggca ctttttccca 240
tgcagcattc tttaaggatg tgccagagta tcttgaaaga tctttgaaga gctatgaact 300
gatagaaata caatcttgga tttatttttt aatcatttgc tagttaataa aattactgct 360
ttcaatgt 368

<210> 557
<211> 340
<212> DNA
<213> Homo sapiens

<400> 557
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caacctccca ggctcaagca ctcctccctc ctgcctcagc ctctcaagta gatgggatca 120
cagggtctta ctcctacttg gaatatagat gggatggagc tgagtggcta agtacaaagc 180
tagaagcagc ctggtccaga tggctataca aacccgaaac tgtctacacc cagactttat 240
tcttctacaa ccaaattcct caaacacaca atctgaacag tagcagtgaa agggagttta 300
aggtgggggt gaggggagaa agggagtaat atggttttta 340

<210> 558
<211> 377
<212> DNA
<213> Homo sapiens

<400> 558
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ctgcccagcc ttcacctgcc cagcttcttg tcctacaggt ctcaagtcaa atgccttctt 120
ctcagtgaag acttccctgg caccttgtca acataaangt catctggtta ttctctctcc 180
agcctgtggc ctatttttc taaagaactt ttcagaatct catccatatc ttggtttact 240
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tgatgttatt cctgcttcaa tccttagcgt ctagcccagt gcttaataca gatttgttga 360
ataaagatcc gttaaag 377

<210> 559
<211> 466
<212> DNA
<213> Homo sapiens

<400> 559
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ctcaactccc ttctccatca gtgcatacaa agctttccgc agcatcaagt cccgatcatg 180
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tcaccaaggg aggctgcatg caggaggcag ttcccatctc cagtagttgc caaaggaagc 300
agcctctgag aggtgggatc cacactcacc caccagttca aacgccctgt agaaacaaga 360
tagtgganga aaangagaat attcatgaag cccttnccct ttctattttt gnaaaaanac 420
tccaaagcag cctcctttag gaggcctacc cagaataaaa ccatcc 466

<210> 560
<211> 455
<212> DNA
<213> Homo sapiens

<400> 560
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tttttgctg tgaagtgagt gccttgatca gaacagtgaa acggcgtttt gaagactcag 120
atacagtgcc aggctaagaa gggagctgct gtgttttctg gggtgattgg tcctggctac 180
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acatgaccca agaaccctac gtcctcttct ggggaaggtt tagtgtgtct ctggttttac 300
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tgttcacaag ctangacctg cccttntggc ccttggtttt gggcnttccn gcctccaaaa 420
ttggganaaa aaaataaatn tttgttgttt aagcc 455

<210> 561
<211> 56
<212> DNA
<213> Homo sapiens

<400> 561
atgctactat ccttcaagat ggtaattaat aaaagacaga aaaatgccta aacacc 56

<210> 562
<211> 397
<212> DNA
<213> Homo sapiens

<400> 562
aaagtttgtt gactcatgac ctagatgact gcaagagcct acaatgaagt ccctctgcaa 60
acagaagcaa aaggcacagt ctgctcctcc taaagatggt cattttctgc tgctatggcc 120
cagtttgtgc cttcaaggac tgactgtgta aaaaagagcc cagaaactct ttgaactgac 180

ttacagtggc ttcttcagca gtcagctgta acgatggctg gagcacctgg tacctgagtg 240
agggccaaga atgggctctg catgtgccct ccctcaacaa ttgcccacca cccattctca 300
cacaaatgca gtgggggatg aacctgtagg gatgggtaat cagcctgaaa ggaacaattt 360
tgcatatgtg taaaatctga aaaaataaat tattatt 397

<210> 563
<211> 358
<212> DNA
<213> Homo sapiens

<400> 563
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atcttttgaa ggcctggaaa gaacaaaaat gtggagaaaa ggaacatttt cttccggttt 120
gagctgagac atcatcttct ctggccctga gacatcagag atcttgcttc tcaggttttt 180
ggactcatgc caggactcat acacattatt agctccctaa ttcacagccc ttcagattta 240
gactgaatta caccatcagc gtttctgggt ctttagctat taatagcaga cagcagatca 300
tgggacttct tggactccgt aattgagtag tcaattccta taataaatct cttcatat 358

<210> 564
<211> 351
<212> DNA
<213> Homo sapiens

<400> 564
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gagtatggct gctatcggag aggagagaga aaatcaatct ctgtgggctg ctattatcca 120
gaagaaatgg agagctccca atgaccaggc attccaccga gcaacagggc ttacttgcct 180
ctgctctcat tgaaaaccac acagagcatg caacactttg ctcactccaa aactttatga 240
ctttcttcan tttcaagcaa tgttgaatgc tgactcaata agatacaacc aaaacaactt 300
gttgatgaga caaagctgag tttatttttt accatggtaa aagtgaacgc t 351

<210> 565
<211> 433
<212> DNA
<213> Homo sapiens

<400> 565
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aaaccaggtt ccgaagcctc aaaacactca agttctcttt tcctacaaca gaccagcctg 120
tgaatgttca ctaattttca accaaatgat gtgctgtaat caattacact ttaattactc 180
aatccagaaa aaagcgatca cttaaataag cctcatggtc agagaatttt ctaaaaattt 240
caaattgctt tttttcccta aaggaatgta ataggatgac aataaaagat cctcacgaat 300
aaaaatatat gagaataaaa tcctggaagt aggactgtaa taaaagcata actccaaaaa 360
aaaaaagggg ccngnggggc caattcagnt tgganttaac cgggntgaac ttgtttaaaa 420
gggggggccc ccc 433

<210> 566

<211> 40
<212> DNA
<213> Homo sapiens

<400> 566
gtttgcatcg ccagcttcta tatattacgg cctttttttg 40

<210> 567
<211> 398
<212> DNA
<213> Homo sapiens

<400> 567
ggtgaatttg ggacccaaac agttaagcaa ccagccaatt tgcttccctg ctgcctccca 60
gccaaggaga tgaatggaat gcacatgagg tcgcttggca ggcatccaca ttcctatggg 120
aatgctgcag cagccagagc tttgggacat gaagaagcaa atgtgtggga gttatggggc 180
aaactgcaaa caatccaaag tcccgaaaaa atgcatggag cctctttggc ccaaggatgc 240
tctgcagaac accggcaaag accctgccct tgcccaaatc aatgatagag gcaggactcg 300
gcactgccct gttctttctt actgctgcca aggccttgaa tcgtacaggc cacttncagg 360
actactgngg atgtgagcca tttaaaagaa cttcaaca 398

<210> 568
<211> 340
<212> DNA
<213> Homo sapiens

<400> 568
atataagaaa gattggagaa ctgtgtgcct ggcaattgcc ttgctgaaag gaagccctca 60
gaaaaagttg tttgatggtg agagctggcc aagccagaaa gacaaaccaa gcgactttga 120
gtgggggctt tgtgtcacaa ggcatcagta gacctggaga ctgagttcag gcaatcaatc 180
aatcaatcaa tcaatcaggc ctacagaatg aaactccaac taaaaactgt ggacaccaaa 240
gctcagctga tttcctggtt ggcaatactc catgcatatt gtcacacatc aatgccagct 300
ggtcaagtgg tagaggacaa taaaaagttt tcacctttgg 340

<210> 569
<211> 434
<212> DNA
<213> Homo sapiens

<400> 569
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aaaaaantaa aagggaaagc cttttgnttc caccaattct tcaaggaacc aggaaaggga 120
aaatatttgg gaaaaaggtg gttttgggag ggaaaggaaa aagggccaaa agaaaantaa 180
aaggagggca tttaagtant cccgcttgca aaagctttgg aaaaaagaaa gccaatggaa 240
agggatgcca cgtttttaaa aggtccggta ggaaagaang gaaaaggaaa aaaaatttta 300
agggaaaaag ccgccatgct tgaaagaaaa agggggaaat tantgggaag gaccaggaac 360
catgccaaaa ggatccaagg aaaaaaggta ttcttcaagg gaaaattcaa aaaaggcctn 420

tttcccagga aacc 434

<210> 570
<211> 483
<212> DNA
<213> Homo sapiens

<400> 570
tgatgataca cagcaggaca accagtcctg aaaaactttg caaaattgat catacccctgg 60
tgctcctcct ttaacagaca tggcagcccc tgaattccag atccagcccc gcctccccagg 120
tctgctctat cttcagcctt acaggaacct tgggcggtgt ctcctgactc aaccatgtgt 180
gacaagaata ccagctttcc cccatctctg agcttctaac gttttttatg cctccccccga 240
cttcaaaagt gttaagagtt cccatgggga tggtgaaatg ggccattcct gaatggtata 300
ataaatctca ccgaacttca ggcatgcctg tcatcagcca agtcctctgg tggggctgct 360
ggcatttgaa actgaggctt ctcacaatgg atttcaattt nttcggttct caagtcaaac 420
tttaagttan tttcaagggg tcactcttgt gttaattagc ttttganggg agagtcacaa 480
ata 483

<210> 571
<211> 676
<212> DNA
<213> Homo sapiens

<400> 571
agatggggtt tcgccatgtt gcccaggagg ggcctcaact cctggggctt caaagtggaa 60
tcttggcttc cccaacaaca accaacccgg ccttcgggcc ctcccccaaaa gtggcttggg 120
ggaatgaaca agggaagccc ttcttctttt tccaacccaa gccgggaagg gaagggaaga 180
acaaggaatg ccctttccaa gccttggctt gggcttgggt cccccaaggg aaccccccaac 240
ttggcccact tggaagaagc cttgaccgaa ggttgggtcc gaagttgcca ccgccaaagg 300
ttattgttgc caagcctttg ggaagaaggg ttgccaaagt ggacccgttg cccttgaagg 360
gtcttaacgg ggccccccaaa atgggcaaga atgaaggggg ggcttcaaat ttccaaggct 420
ttggtcttgt gggggggtgg cccttccctt gggacacaaa gggaacttgc ccaaacccct 480
tgtggttgga aatgtgaagc ccttcaattg naaaaggaag aacaaggtgg aagaaaagcc 540
ccttgaantt gccttgggtn ggccttgtaa ggccttgcnt taaacttgtn aaatacaaga 600
atnaaatggt ncccaaaagc caccttgggt ggggcttgtg gaagcctcct tcaaaccttg 660
gtnaaaataa caaaaa 676

<210> 572
<211> 390
<212> DNA
<213> Homo sapiens

<400> 572
ttcaggaact gagtgctggc cctggtcaca ttaagggagc caactggtct ggctttgggt 60
ggttangtag gaacatttta ancaagccct tcttcnattc ttgggcaaan gttcaaattt 120
ggtcaaccaa aagccgcttg gcattcaggg aataaaggaa accctttcaa gccaaagcca 180
accaagtgga cctaagcctg gtggaatcct aaatggaata aaccctttc catttttcat 240

ttttcattaa ttttaagaat tttaataatt taccctttct ctttcttatt taaaaatggg 300
gggcctagtt tgtcccattg ggaagggagg tcattaatga aaaattattc tttcttaaaa 360
aataaaaata ttatttcaaa atattttttt 390

<210> 573
<211> 606
<212> DNA
<213> Homo sapiens

<400> 573
ggattctacc atcaagaaaa gaggcccaaa ctttctattc attcatgggt gggaaggtga 60
angtggtctt ggagtggaac tggtaaaatt ggcagaaacc caactttgga ggaaagcttg 120
ggatttttc acccttgggc cccaaatacc ttaccgttgg ggccttgcaa aggaagccac 180
ccaaagcacc caagaaatca cattattggg gacctatcac ccaaaagaag aagaagacta 240
cttgcggcgg aaagacccag actattcgaa gaagctggaa gaagaaagaa ggtttcccca 300
agtgggcttg aaagccttgc ttgtgcttgg tatttcttca tcaattgtgg gtgttttgtc 360
ctaccctgga cttgngggaa aaataaantc gcttgtttgg gttaaagtaa atttaagcag 420
ccaaaagcaa ttgcttncca agccgaaggn cctccttgct ttcaaggaaa agaaacccaa 480
aaccacttac cccttgaaag gggccaggcc taagccctgc aagcccсttn cctttgcang 540
ggaggccttt ccctttgccc ctggggcntg nttnttnaca aaaatcgggg gtcttggggc 600
ttcaaa 606

<210> 574
<211> 468
<212> DNA
<213> Homo sapiens

<400> 574
gagatttctc cctctgcgct gaggatctca ctgtgcacct ccagccctgg gtcctggtgg 60
gctctggtgg ccactggagt ctttggaact gcctccctct ggctctgctg ggggttggatt 120
cgggcatcga tgtcacaccc agcaggaaca actggggcca ctggaggatt cccaaggaca 180
caggttgtcc ttttcatgca ggaagaatct gaatcgtttc catccagttt ccccggcatg 240
cagcagaata caacacaagg ggctgcggtc ttctctgact cttaaggccc ttggaagatc 300
ctgttctgcc aaaatcaggg tgatttgggc aagcatcctt agggctctgg accttaattt 360
cttttcctgg gtgattgatt gacatatang ngtcctaact cacataagtt gnaaaacaaa 420
atgtggggga aagggcnttg anaccaaana caatgttatt gtcctgaa 468

<210> 575
<211> 403
<212> DNA
<213> Homo sapiens

<400> 575
aaaaggctaa cattcttgaa aaagagaaga tgtatccaat gggcgccttt tcttntggga 60
atcgagctgc cattcgangg acattcactt gggccagaag atcgtaccga catggctgct 120
caaacgaagt ccagatgccc acatacctgt gctctttgcc gtcatgaaac tggaaactac 180
gcatttgctc cgggatatcc tgttttttaa tttcacaacg agatggaact ggctgaaact 240

ggacaacacc attggaccac actgggactt atttgtgatt ggcctcattg ttcctgggct 300
gattttgttg cttagaaatc accaggggta ggatgcggat cacaggaaaa cctgctcaca 360
ggaatcaagt tcacttccan gnattcccca ctaaataaac aag 403

<210> 576
<211> 469
<212> DNA
<213> Homo sapiens

<400> 576
ggaatataga gggaatatga atgacatcac agcagctgcc ttggagccct ggagcctgaa 60
gacatttgag atggatacac ctaaggagag gaggagaagg tggcaggcag atttgaaaaa 120
aatgtggatt accattaaaa aaggatttgt aagcaatttc agaaatataa tctccaagcc 180
tcaggaatta ttttaccctt actttttaag aactggtatt attatactca taatgagagt 240
cataaattat gaacaagaag aaggttggtt attattattt gtttagtatt accagccttt 300
tcaattccac acaagagggt aacagaaaca aagctgtgag gatacccttg cagttgnaca 360
ttcttgggaa ttttgcattt aacaagggaa aggatcatca ctgnaaatat attttcaant 420
tggnaacaan ctgagactca taaatggnga ttntntgaca cataacaag 469

<210> 577
<211> 371
<212> DNA
<213> Homo sapiens

<400> 577
gcccacactg gagaagcggc aggcctccac tgaatggtcg aggtccttaa ctctcctgcc 60
agtcaatact gtctgcctgt catattgccc taaccttggt gaagacactt gtcaaaatga 120
acagcgacac atgcttctga ctcttaaaga actaacagcg gatcctggaa atggaagctg 180
ggtagtaatg gaagctactc tcctacacaa ctgagatttc tgatcccaga ccccccaaata 240
taggaataaa tgagctactg aaccacaaaa cccaacacaa ggtcacacac acttgtaaag 300
tggctaactg ctttcattgt tttgcataaa atgtgtattc tgcaaagatt attattaaaa 360
ataaaacaag c 371

<210> 578
<211> 345
<212> DNA
<213> Homo sapiens

<400> 578
aaattccagg ggactaatat tggagaatga accnaggctg gganancccan cctgcaaaat 60
tccaaaaagg acctccnggt tggttngtct acaacccagc catcgtcang ataacattag 120
actgcgttcc aggtgggacc atgacttcaa ggatagcccc cagaccaagg gccccgggcca 180
cctaagcacc ccagcaccca cttcctggca tgcctcccac tctaagttcc cctttataaa 240
ccacctcttc cacaggtcga aagtttggaa atcgtctttt aagggcattg aagcttggcc 300
attcccagat cttggcattt gaataaagta agctctctgt tcatc 345

<210> 579

<211> 501
<212> DNA
<213> Homo sapiens

<400> 579
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ttttcnaaan gcgacntttn gngctcntta ctactagagg tcncaataca gaatagggta 120
tacgtcgttg ccggctcttc agtccccaaa agcaggggta tgggccatgc agggaaataa 180
agggntacag aagtggcttg acattatgct tgatggacat gctgtcttca ccccaaaaaa 240
agatgccagc aaagtctaaa actggaaaga gctttggaag atcaccaact taacatcttt 300
ggtattttaa agacggatga ataggtcaag gtgagaaaat gagttcttca gtggcatcca 360
gccccttga tatcacangc cagaagatgg aactacttcn ttcccancct nttattatta 420
aaaataggct actnttcntc atcccacacc ctttctggat atatcctatg caaatgccan 480
cagaagatct ttgcaactgg g 501

<210> 580
<211> 443
<212> DNA
<213> Homo sapiens

<400> 580
aaaagaaaca tggaaagaag ggtcagggag ttggaagagg agagaacatg acatgcgata 60
cttccacttt cttaaaggca acactacata agacatctgc agcgctgtgc tggtcaacgc 120
tagattggtg gatgctataa tggaaatgga caaagggtct gtgtatcgga tgtcaacata 180
ccatgccaag aagccatgta aatgcaccaa gagatcctgt ttttgaagtc tcctctttaa 240
cacacagaat caaaatggca acatccatga tggagaagga agagggtccc cagcccttac 300
cagccaggag aactcttgat gacctttcaa tggggcagnc atgccttggc atcanaaacc 360
tcaagggagt tggctttttt tccattatgg ncatagtctg gtaacaaatc atctgtttaa 420
aaataatata taactcgagc tcg 443

<210> 581
<211> 336
<212> DNA
<213> Homo sapiens

<400> 581
agaaggaagc agatgcccta caaagcccat gtatagtcac ccaacaaaat gtactggacg 60
actgccatgc accagccatt ggagctacta gctcctgaga agccacatcc tgactaaatc 120
agcagaagcc acgtcatcca gagataatgg gatggagaca ggggtgcctc tgaggctgag 180
gtgactccca tagggatggg tagctaaaaa tgaagcatag agtggcccgt tcatctttca 240
tcttccccct ctctcgggat tgctttgctt tgctttacta ttttggctcc tgagacaaga 300
agctacattc caataaagct ttcttaatgg acactg 336

<210> 582
<211> 483
<212> DNA
<213> Homo sapiens

<400> 582
agaggctgtg atnnctggaa tgtttaatng gntggntgat tggacttatg cctttggtca 60
gcagctcaaa gaatgctaca attcactctt ctacaaagca gacatccagc cttgataccc 120
aacccagaac tctgaaagaa tgaaaatttg ccatctctag caggtggaat tatcagaggc 180
ctctggaagc tgccatggaa acaagctcac taaaggcttc agcaactgct cagatattta 240
atttcaccca cagtgaatgt aatccaggca agaagtgctc acaatatgaa aacattgatt 300
agcaggggac tgcatgtgta ccttgctggg tacaggcccc actttctttc tctttgagga 360
cgcttagctt gaacattcca nggggaaaga catccaaaaa gcatcgccac aaaccagntg 420
ggaagctgac caanaaaatc atgggttctg cccgcaggga ggaaaacaca gggtaaatcc 480
ttt 483

<210> 583
<211> 294
<212> DNA
<213> Homo sapiens

<400> 583
gactgaggct acccaacaaa tttcccagcc ttcctgcagt gaggtgggag ccaaatgact 60
aaattctgtg tgttggagag ataaatgcca cttctgggcc tgacccctat ggcccctgcc 120
atgctggcct gaagaagagg gtgcagtgga ggatgctgag gccataggga atggtggagc 180
cattagacag agaagctggt cccagaactt ctgcaagaag cagagtcctc ctttcatcca 240
taatgaccac cactgaattg acagcacagg aaataaaacg ttactgtgtt agcc 294

<210> 584
<211> 66
<212> DNA
<213> Homo sapiens

<400> 584
nttggacnac tatngtggan ccantgggca ctgngcngng aaatgcagag ctgaccaggc 60
atgagc 66

<210> 585
<211> 343
<212> DNA
<213> Homo sapiens

<400> 585
accttgagaa catgcctgga ctaccgtgct ggaggaggac agacacatgg agcatagccc 60
gagtcccccca cccggtcatc ccagcagaaa cggtcctgga ccagccacca ccagccagct 120
cccaggcaca tgaaggagtc ccgccaagat cagcagccgg caagctgacc cacagccaac 180
tgcagacgca tgagcaagcc ttaagcagct gaaatccacc aagatcaact gaagtctcca 240
gttctgggtg ccagtatttc ttgttgtatg cccagaagta ttgtggctct ttgttaattg 300
attaattaat aatcatggat aatataacag atcattggcc aag 343

<210> 586
<211> 409

<212> DNA
<213> Homo sapiens

<400> 586
tgtggggagc tacactgcnt taagtcatga acngccacct tccgtgacgc tcacagccct 60
tnttgatgtc atccagctct tatccacnaa tcctcagctc accatggaaa tgcggatttc 120
cccaccttca atctgcccca tcacaccagt gatgtttcag ttcactttgc actggttctt 180
ctttccaccc agaacactct tgtgccaggc ggacccacaa cgagttctct aattaccttc 240
aactccttgc tcctatgtct ccatcccaac aaggcctacc cagaccttcc aatcgactat 300
ggtaactgcc tgtctcctcc ccacccaggg ccatctccag aactcccaac ccccactatt 360
tttctccact gtcttttctt tatagtactt tatcttttaa aaaggaatg 409

<210> 587
<211> 396
<212> DNA
<213> Homo sapiens

<400> 587
atgcanaaac cacggcccag ggaagacgca gcttgagcaa ggtcaccggc aggccatggt 60
tttgcgggag gaggagctac agtcagtctg ccttggagct caccaccgtg tttggcccat 120
ggtagatgcc cnacagaana cacannegnt gttganggct cctgtnaagg anaanctgcn 180
ntacaagaag gttgagtaac tancccatca ctcagctaga actggccacc ancatggatn 240
ccanatagcc ctactccana gttgcccatg ctattanccg tgacgccatg ctggctgtcc 300
acacccatgc ctttttcctg ccttaatctt gcaatgattc ataaggaaag gccatattat 360
gacacagctn gaaggcagnc atctgcaagc caggac 396

<210> 588
<211> 410
<212> DNA
<213> Homo sapiens

<400> 588
accagccaac acttacggaa aatagaacct acgttgaaat attgggggct ggtttcctct 60
atacaagagg agtcatgaat atttatgaaa ggagaaatcg cacatgcaca ggatgacctg 120
cctgcagaag gagctaccca ctgaaggtcn cttctctgct gagagctgga cactcattgg 180
gatgaactgc ctgtggaaag gagctaccca ctttgggtct ctagagagct gttctgttgc 240
tcagtgaagc tcctgtgcat cttgctcacc ctccaattgt ctgcatactt cattctncct 300
ggacatggga caagaactca ggaccaaatg gtgggactga aagagctatg acacaancag 360
ggctcaagat ttancagcca acaacnaaac aaaataaagc acaataaatg 410

<210> 589
<211> 335
<212> DNA
<213> Homo sapiens

<400> 589
aagttccagg ggctaatctt gagatgggca gaccaagcct ggagacccag ctgcaaaatt 60

ccagagatta tctcaaggtg gctagtgaac aacccagcca ttgtggagat gatgtcagcc 120
catgctccag gtagactgag acccaagaca gccactggaa tgagacacac agacattgta 180
ttcagtctaa ttcttgcatg ccttccatat caagtttccc ctttttaatc ccttgcccct 240
tgtctttccc cccaaattca aagtggtcac tttggatggg aatccagcca cttcccatta 300
ctagttttgg ttaataaagt cactttcttt ccacc 335

<210> 590
<211> 405
<212> DNA
<213> Homo sapiens

<400> 590
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ccatcccaca ttctctgcct ctcctgctgg aggaggctaa caccaactgt gcaagtctgt 120
tttgctacaa gtcacactat gagaagatct gggcattggt tccccatcac ctgggccagg 180
actgatccta tggacctgct cccactcctg ggaaatgcgg agataggatc gtccagtatg 240
cctgctaagg ctgatgttca gattaaatga gatcacagaa gatgggcagc tggttgcact 300
taaaggagct gggaaatgga gcccagtctg ctgtgatggg tcctggatta ccaacacacc 360
ttgctgtgga ccttggggca ganggcactt caactcccaa tttct 405

<210> 591
<211> 211
<212> DNA
<213> Homo sapiens

<400> 591
ctgtgtttaa caaaggtcgt cgggggagtg actatgcccc agagtccacc atgagagtgc 60
tgaagagcca aaggtgatgg accccctctga tgcttccctg ccatcagtga gagaagcctc 120
atgtttatgt attttctatg ccgagatttc actcaatatt taatgtagag gagggatttg 180
gctgtctaaa ataaatacta ttattatttt t 211

<210> 592
<211> 397
<212> DNA
<213> Homo sapiens

<400> 592
agatgaagaa attggggctc acggattaag tgacacctat ttttcatatc acacactaca 60
aaatctcaaa cacagtatct caactcatga aacattcggt cctaagatat caagtgcaat 120
ctgattccag cctgtgcatt ttgacaacct ttgactgctc tgccaatcgc caggtgcccc 180
tctccagccc agtcagtcgt ttctggctcc attcataact ctgccggatg cctcattaga 240
gaagtgtcct gagacttctt gtgagatatg ccttcctgag acctacccaa tgtgcccatg 300
ctgactccta ccagacagct gagagaccaa ctcagagaag aatagcaaag aaagcagaaa 360
atgggaggct ttatcccagt gcccaatccc tgctagc 397

<210> 593
<211> 420

<212> DNA
<213> Homo sapiens

<400> 593
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ctgtcctctg gatcttcctg gtgtccatgc ggggctgctg ctctgngctg gccccagggc 120
ctttggccag tgtccatgag acccggaatt ccagcaacca gtttgacaac tcctacagag 180
aaacaggatc cacataagga tacagcttct tcatatccct gtccatgact tcaccctgcg 240
ttctttcaac caaatcaaat ggtggtcagg gcctcttgag cccaggcctg caccgtatta 300
cattccaaga tggcattgaa agtaacttga gggaaatcac caaaaagaaa gtgaaactgg 360
ggccgggttc ctggccttaa ctgatgacat taccttggga aattccttct tcctggctca 420

<210> 594
<211> 316
<212> DNA
<213> Homo sapiens

<400> 594
gagtatgaag ttaaacaaac aagagaagat gaaggaggaa aagaagaaga tggaggagga 60
caaagttttc agaagtgctt attagagcta ttacatgcca aatatctact ctgtgggaaa 120
agcaaatttc acatttttat caactctgta ttcctacatc tgatcaagag atgttagaag 180
ccagttcttg agaatggcag gaccaccttg tggacataac ctgggtcggt gaatgactgc 240
acggagcaga gtcctacctg tcaagacgtc agattatgat gtgaataagc aataaacata 300
tattttgtta actcac 316

<210> 595
<211> 133
<212> DNA
<213> Homo sapiens

<400> 595
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nactctctnt ccaccatgan aagacacaat gagaaggctg ccatctgcct gccanaagga 120
gagccctcgc tgg 133

<210> 596
<211> 397
<212> DNA
<213> Homo sapiens

<400> 596
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tctgctgtag attttaacat caagaaagaa ccctcatgct tggaaacact gggaaccact 120
ggtgaagagc aagagccctg ggaagaatca ggatttcact tggcctctgc cactgacgtg 180
cggcatgact gtggaccagc gacctgcacc tcttgtgccc cagtttactc ctctgtgaaa 240
tgaacactca tgcgagatga tggctagact gtcaccaggt ctcctatttg ctagtacggt 300
gccctctttg accagcagaa taaagatgga taggtgttct acctacatac agtcatcaaa 360

ctcatcaaac tgtgagcagg aagagagaaa agactgg 397

<210> 597
<211> 318
<212> DNA
<213> Homo sapiens

<400> 597
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aaaaaaaaat cacaaacgag aattttggat ttcaaggaaa tgttcgattg tanangacag 120
gcncntggca aaanangnga gggctatgtn aagatnnagg cnaaggttga antgntgctg 180
ccacnagcca aggancacca cganccacca caagctggan aaggcaaaga aggantcttc 240
cctanaatct ncanaggaag ngtgggcctg ncaccacctt gantntggac ttctggcctt 300
cggnnctggc aaagaata 318

<210> 598
<211> 374
<212> DNA
<213> Homo sapiens

<400> 598
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acatgatgaa agagggaatt tggataaacc atggaatgat gacatcacat tgagcaccat 120
ctggtataaa catttttgct ttctgcagtg accagatgaa ggaaatatgg tgccgtgtgc 180
ttcttcagtg attaattcag gaaagccttt gctgagctga aatccaaaat aggaagaacc 240
caccttccac atgttcaaga agcttgtgat cccagggatg acactgccct tttcctctga 300
aggaaagaag tttcccctga ccataatgcc aaagctacaa acacttacat acctccataa 360
ttttgcactg aact 374

<210> 599
<211> 366
<212> DNA
<213> Homo sapiens

<400> 599
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aaccacaact ttaaacttgg cccaacatcc agtgccttgt ccccaggggt gcaaatatgg 180
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gtcncatcta tcctgagggg ccttccagat ggacacatgg acagccagtt ctggtcccct 300
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ttgttg 366

<210> 600
<211> 240
<212> DNA
<213> Homo sapiens

<400> 600
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aaaatcttag tactaatttt taaaaatggc ttttaatttg ggggagactc gataacagaa 180
cccgaaaatc tgatgaattg tatgaacatt ttgttcagaa aaataaacat atattaccag 240

<210> 601
<211> 411
<212> DNA
<213> Homo sapiens

<400> 601
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ttaactgaag tcacaaggct cacggcagga ccagtatcaa aatagacccc aatgtgcggc 180
aggctcatca gtggaagtga cttaccctgt ctcagatgag gctttgtact gtggactttc 240
gaggcacatg ggagcctcgg tgaccaggga ccatgttgct attccttatt gtgtaccatg 300
ccagaaggaa attttaaaat cctgaaatac tctttttgat ggctggaaga aaaatattgt 360
aaattggtaa tacagagaaa atctgctaat cttgtcaagg aattttggac a 411

<210> 602
<211> 233
<212> DNA
<213> Homo sapiens

<400> 602
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gcggcttccg gttggacaag atggctaccc cagngggctt gtttcctctc tggtctcttt 120
ttctgtctaa gactcactcc ataccagcct gagcttggga ccattgtttt gctcctctca 180
tcctcctacc cccagagctg acagatttag caaataaaat ttacaagatt ctg 233

<210> 603
<211> 256
<212> DNA
<213> Homo sapiens

<400> 603
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cccagatctt cgtttctgaa tttctctttc cactagaaga aaccatgaga gaaatggcga 120
gcctgagatc ctttattgca ccaaaagcaa ggaagtatgg aaggagagct gagggcttgc 180
caggacattg gccgacatgg tctctcactg gtcaaacttg ggatggttgg aacatcaata 240
aagaatatta atgatc 256

<210> 604
<211> 290
<212> DNA
<213> Homo sapiens

<400> 604
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aagcattgtt gggactcaca aaacagctgt gttaagcatt actacctctg aacgcttcag 120
gaggaaagcc acattctcct gtggaaggaa atagttgcag gtgatacctg ctcccttcac 180
cttctgctgt gagtggaagc tccctgaagc tctcaccaga agcagatgct ggcaccatgc 240
ttcttgtaca gcttgaggaa ccatgagtta aataaacctc ttttctttat 290

<210> 605
<211> 404
<212> DNA
<213> Homo sapiens

<400> 605
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acattcatac aaataccaac tgtgggccaa acactgaaga tttccagtgc ctatcccaga 180
aatctgcact cctgttcctg ccaaactcct gctctgcgtc atcaggtaat tcccagcaaa 240
aggcaaagtg tctccatgag tcacttcgtc ccaacgctta aatggngttg gcttcttagc 300
tatgacaggg acatcacaga gcacctggtt gaggctgtca ctctatgcaa taaccagctt 360
tcggccaaat gaaagacagc accaaagtca tcaccaactg actc 404

<210> 606
<211> 402
<212> DNA
<213> Homo sapiens

<400> 606
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gctctccagg ttaataacct ttgctggtgg ggttctccan aatcagctgc caaaacagag 180
tctgagtttc aaggtactta ttagggatca agccctgtgg aagacacagg ggaagctgaa 240
ctgtgagggc agcccacaga agcctcccct gccctgcagg gagctctgga gtgaatactg 300
ttctgtccac cagagctggg ccccagtggg caaacaagac caggcctttg caccccccacc 360
tcactcaaca tcaagctgtg tgggttgtcc taagaagggg tc 402

<210> 607
<211> 401
<212> DNA
<213> Homo sapiens

<400> 607
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ggtgaagcct ggcagatgtc acttacactg agtgatccat gttgccatct ccagggtgac 180
acggngtgcc tgtgacatga agcgccaagg ggaacccaat gtcatttctg gggttcttcc 240
tgccccaaac agtccatttg gttaaactca cnagagtgtg tgcttgtcga tgtagctgat 300
tctgtatggg tggggatttg gaccacccct tcactactca aagtggggtc ttgtacacca 360

gcagcagggt tacctcctta accccgagct tgtaagaaag c 401

<210> 608
<211> 242
<212> DNA
<213> Homo sapiens

<400> 608
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cctgtcactt aaatataaaa gacaaggcaa agctcgcata attctaagat ggttctttag 180
gacattggnc tgcttcttct tggtttcctg gctccccaaa ataaagtcgc tttccttcct 240
cc 242

<210> 609
<211> 284
<212> DNA
<213> Homo sapiens

<400> 609
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aggagagatg gctgccactc caaagaacaa gagccagagg gggatttgag ctggaaccta 120
caaagccctc agaaggcatt cgatgcctca ctggaatgcc catcatttca catgtcccca 180
gtccccactt atccccctcc actcctatga cactgctggc ccagcatggc gtgctacata 240
caggtgggaa tctgtccata tcaataatcc aaaccatctt ttcc 284

<210> 610
<211> 157
<212> DNA
<213> Homo sapiens

<400> 610
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tccacgaatc cttcagcttg accatgggna atgcggactg tcccccttc gtagtggcnc 120
cagtgagaca ctattntttt aaaaataaaa aagagca 157

<210> 611
<211> 345
<212> DNA
<213> Homo sapiens

<400> 611
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gtacagagaa aggagcttgg aaagaaatg ctctacaggg actttaatat gacaggctgg 120
gcatacaaaa ccattgagga tgaggacttg aagttccccc ttatatatgg agaaggcaag 180
aaggcccggg taatggcaac tattggagtg accaggggac ttggggacca tgacctgaag 240
gtgcatgact ccaacatcta cattaaacca ttcctgtctt cagcttcaga agtaccgcat 300

gangtttttg tttatatttt gngcaataaa aacattttca gcggt 345

<210> 612
<211> 429
<212> DNA
<213> Homo sapiens

<400> 612
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aagcatgctg ggattgattt gtgatgtctg ccacgaatat aagattggcc atttggggca 120
tgaatgctat tcatggattg gatctcctaa gagcccgaat ttctgagaaa ccactgaaga 180
cctgacccca gcgcttaatt atttctcctt tccaagcatc tctcatggaa ggcatcttgg 240
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cttttgcaga ggacaggtcc ttaagggcaa aatcgcttaa gagtcaaaat ggccttgaaa 360
attccttggg aagccgtcat gttggagcca accactattt ctcaataatt tcagcacaag 420
ccagttttt 429

<210> 613
<211> 418
<212> DNA
<213> Homo sapiens

<400> 613
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ttcctgagca cactccaaga cctgggagag gcagaaagaa agaagaaatg caagtctaca 120
atatgagata caaagtttga atttactggg aaagcaaaga gaacacatcc gaacaaaata 180
agaagaagaa atggtgtgag tattgttgca ttgcgaatgg aatggagaac aatgaaatga 240
gggctagaag ccaaaccgag ggtgaagatg gtcaaaatga ggaagataat ttatctttaa 300
tcaaaaatat aataatcacc agaataataa taaccataag aggtcaggaa cagaagaagg 360
gtgaaaacag agtcaacctc aaangcaaac ctagtaccac agaaccaggg atggacaa 418

<210> 614
<211> 362
<212> DNA
<213> Homo sapiens

<400> 614
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atcaccagaa gaccagcatt aaaagaaatg ttaaagttct tcaggcagaa gaaaaatgaa 120
accagataga aaaacgtatc tacacaaaga agaagagcat cggatttgta gtcactccaa 180
tgcttcctca tcaggaacct agaaagctgc taagaatcca tctcacccag catcaaattc 240
cacagcccta atgnatccag atatactcag aaatctacaa gtcatgtcaa cttctatgtc 300
tttcacttgc cccaaactct gtgccaggta ccatgggaga tgaaataaac atttcaaaca 360
tc 362

<210> 615
<211> 195

<212> DNA
<213> Homo sapiens

<400> 615
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aacagctgaa gccccttcac cttctgccat gagtggaagc agcctgagga cctcaccaaa 120
ggcagattct ggtgccatgc tccttgtcca atctgcagaa ctatgagcca aataaaccat 180
ttttctttat aaatt 195

<210> 616
<211> 170
<212> DNA
<213> Homo sapiens

<400> 616
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acagctccaa gtttcttagc atcagctttt tctgaacaaa atagtgcatc ctgctggaat 120
cactactgta aactgagtat aaaggaaaat aaaccctctt tttcttatcc 170

<210> 617
<211> 98
<212> DNA
<213> Homo sapiens

<400> 617
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aacctgccag caccttgatc ttggactttc agcctcca 98

<210> 618
<211> 270
<212> DNA
<213> Homo sapiens

<400> 618
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agatttcaga tgaagtccct atgccccgtg ctggctgggg agtgtggact atgagcatga 120
gagagagctg ccttctctgg gaacaagaac tgttggctca tcccataggg tctggtctgg 180
ggtctggcac agcgctttcc tcatagtgat gttcaagaaa tgtttgctaa atgaataaat 240
gagaagatgg atacagactt attaaaatgc 270

<210> 619
<211> 418
<212> DNA
<213> Homo sapiens

<400> 619
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tggtgtgagg gaggaatctc gtgattgtta gcgtatattt tctgcattct acctgaaatt 120
gtcaacgaag tgtaggaccc aggtcagtgc ctgtctcata gtaggtacct aactaactac 180
ttgaaagaat gaacatcact atgaggaaag tacaccatag tgaccatttt acagatgagg 240
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cactcggata tgcaatataa ttttgaaaaa ttaaactaca tgctcgagga aggattcaac 360
attttccgga gaacccccagc attttccctc agaagactaa aattagatcc tgttttaa 418

<210> 620
<211> 423
<212> DNA
<213> Homo sapiens

<400> 620
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ccacctgcat acacatggag atggactcat cctccagcta ctttggatac cgtggctccc 120
atttttctac tttctctgaa ggattgaagc caccttgccc agaagtcacc gggagttatg 180
cctcctccct aaggatggcc cacagccagt gcctcatcgg agcaagaggt acagaagccc 240
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tggcatcaga ctgacattgc tggaagccac agtcttcctc agcttctcct tccctgtcct 360
gcttccctca ctcccttatg gttttctcct gagggcactc ccttaataaa tcacttgcgt 420
caa 423

<210> 621
<211> 205
<212> DNA
<213> Homo sapiens

<400> 621
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aaagaaaaat tcacttgaac cacttagatg tttcttcacc aaatccagat gtttggcagt 120
gcagataata cttctggata atgagtgact ccccctacaa tcaacacttt catcacactg 180
ctttaattaa aaaaatagtt cccat 205

<210> 622
<211> 418
<212> DNA
<213> Homo sapiens

<400> 622
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aaaaggtctt aaacatcttt gccatcattt ataatgcaga cttcatgctg agaagagcac 120
tcgacactgc caccgaagtt ctgtttctgg tgttgttttg tcaattatgc tgatgccacg 180
ggaccatgga acagtgccac tatttccaag agcaacagca aatcgaaaaa tcttcatgca 240
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gtagtaattt tccaatctat cctttaaaag ttcaagtgta ttattgcatt ttttaagttg 360
naaaaagaat ggatggtnca catatcctta acatagnata taaaagcact actcaata 418

<210> 623
<211> 156
<212> DNA
<213> Homo sapiens

<400> 623
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ctgggagctc aagccaaaag catggacaag ggagtcccag attacaggat actattatga 120
cttttgcata aatataaact cctattagat aaattg 156

<210> 624
<211> 423
<212> DNA
<213> Homo sapiens

<400> 624
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gctctctctg cctgtggaaa gccagtggat tgggctagga tacaaatgcc ctccatcgat 420
ttt 423

<210> 625
<211> 263
<212> DNA
<213> Homo sapiens

<400> 625
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ctgaaaggaa agcaaagcac tcttcattaa cagctagtgg gctcctaatt tctgcccatg 120
aaggcatgtt catactgaca gagcaccccc tcaaggggaa gaaccatccg cgctaattct 180
tgttgtcctc ttctgagcta gtgtgctcat tgttcataca aactagtgtg tcaacattaa 240
aacaaaaagg gagttgaatc aat 263

<210> 626
<211> 411
<212> DNA
<213> Homo sapiens

<400> 626
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ttcagaaata tgccataatg gaacaagata actaaaagaa gaaaactacc tcaaggttaa 120
aaaaacgaaa agaagagaaa gaaaaaagga aagaagcaga aggaagaact ctgctgcagt 180
actggaagca ggcagattat ttaaattacg gtggtgccat ggaacaagag aaggcagatg 240

aagagcgaca cccttcaagt taacacagga acaattaaca atagaatcct taagatgcaa 300
aactccttgc tgtttaccag caccagaana gaggaagaag nggntctggg ggaattgcgt 360
gccantctgc ggcaggttgg ctggaaaanc anccctggtt ggagctttgg a 411

<210> 627
<211> 121
<212> DNA
<213> Homo sapiens

<400> 627
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gatatgacgg acatgagaag cttcagttgg cctcaaatgt caaataatat ccttcctgaa 120
t 121

<210> 628
<211> 196
<212> DNA
<213> Homo sapiens

<400> 628
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tatagcagga aggaagcagt cttcaagcaa agaaaagtgc tcgtgaaaga agagctgaac 120
cctgctagaa tattgatctt ggactttcca gcctccagaa ctgtgagaaa ataaatttat 180
gttgtttaaa ccatgt 196

<210> 629
<211> 161
<212> DNA
<213> Homo sapiens

<400> 629
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tgagtggttt ggctgggaag ctcacaatga agaacaaatt gcaccacaga atggctggaa 120
aagttaatta aagcaacctc accaataact cagccagtaa c 161

<210> 630
<211> 444
<212> DNA
<213> Homo sapiens

<400> 630
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ggggatgatt cattcttctg ggaggaaaag tcctattggc aaaggattct tcttcccttg 120
tatacatgtg tcactgaaga tcagaacctg cactctacgc aacaaagcaa cagatgaatt 180
tttacagtgc tataagtttt aagcatatag gaaagaaagt ggaacagtgg ncagagtctt 240
gggtttggcc tcagcaaaat ggtgcttaan agtgacagcc ttggtgntaa cagataattt 300
tcaaaactca caaaaccatc aaatnangaa tccnttgngt gccatttctc atccattggc 360

aatggatcag gcaactgtta gctattctaa gtgaaatttt gtgaaatttc aaattcagtg 420
cttttttaac caatattaaa agtg 444

<210> 631
<211> 421
<212> DNA
<213> Homo sapiens

<400> 631
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tctncaagat gatgnggcng anggtatttg aanacantga gttnggaggg ggcacacagc 120
tggagaaagc tcaaatgtcc tgatgccaan aagttcattc atggaccatc caccctnctg 180
tccacacacc cagtggacgg agacagctgc cctctgctaa ggatttccgc atgggggaga 240
gcctggctgc tgtcgagcag tccccttcct cccacctctt ccaactaggc tcttgagaat 300
gtcagctacc acacagccac agctaccaca cacctgcttg aagaggagac accaggacac 360
ccatcaaaag ccagaactgg catctnccct gtgggaagtt cttncttgtt taacctcaat 420
c 421

<210> 632
<211> 246
<212> DNA
<213> Homo sapiens

<400> 632
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ttcagatgtt ctcctatcac cagcacagtg cccagcacgt gggaggtatt caactgctgc 120
taactgttga acaaaccagc cgggtcatct gcaaaatgac tgtcctggac tcctcaaaaa 180
tgtcaactca tgggagaaaa aaaggctggg gaatcattct tgattaaagc acaccaaaga 240
gacatg 246

<210> 633
<211> 165
<212> DNA
<213> Homo sapiens

<400> 633
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gagcaccata tgtggtattt taagaaactc ctatctttta aatatttaaa tacagtgctt 120
gaaccttatt tgtattaggt taataaaaaa acaaatttcc atttc 165

<210> 634
<211> 323
<212> DNA
<213> Homo sapiens

<400> 634
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catgatgtca ggaagccaaa ctcgatggaa aggccattaa gtgggtactg cacttgacag 120
cccagtgtca ttcccagcaa acagtcaaca ccaacagtgg gagagttgtc ttgaatgtct 180
acaccagtct aatcttcaga ggacagcagc tccgtgacat ctgactccaa ctgcttgaga 240
gatcttatgc cagaaatacc cagccaagct cttcccacat tcctagcccc aaagaattnt 300
tagcaaaata aaacagttgt ttt 323

<210> 635
<211> 105
<212> DNA
<213> Homo sapiens

<400> 635
aattcctgtc tngagcatnn gcttnnacct tgtgtaccna gtcactctgt tgctgctgtc 60
ggtacagatc gcttccccaa ggaaataaat tacatttcat tctct 105

<210> 636
<211> 414
<212> DNA
<213> Homo sapiens

<400> 636
gaatgaagat aaaatcaaga catcttcaga tgaaggaaaa ctaagacaat ttgtcatcaa 60
cagaccgact ctaaaagaat gttcttccaa cataaatgaa atgaattaag aaggaaattg 120
taacattaag aatgaagaga taactatgaa aagagccaaa aaatggatca ctaaaacaaa 180
ctatctttct tcttctgagt tttctaaatt atattgagac agttcaagaa aaattacatt 240
gtctgatgtg gttctcaatg taagtagagg aaatatttaa gcaacaatga tataaagaag 300
agtgggtaaa gggacctata tccagataag tcttctactc tttacttgaa gtgggaaaat 360
gcccctagca gagtgtgatc aaaatataaa tcagattata tcactttctt gatc 414

<210> 637
<211> 386
<212> DNA
<213> Homo sapiens

<400> 637
aaataagtat ggatggagag aggggattat agcagagcga atagtgttga agtcttggtg 60
gggacattcc gatttaataa ctttggagac agaggatgtg ttccagctca cagactttca 120
ggaataatac tggaaattga catctaatca gcattttatg cactataatt gtgtaaactt 180
ttaggcctgc tgtacaataa tccttccctg ctgtgtggtg agcactttgg ggcccctctgg 240
atgctagatg tgatatgaat gggaagcatt attattattt atgccttata atatgtcaac 300
tctatgtcct ctgccacaac ngacacttat ttcaaatgtg cagtaacagc ccccaagtga 360
tgtattggca aaatattttt gaaacc 386

<210> 638
<211> 185
<212> DNA
<213> Homo sapiens

<400> 638
gacatcaagg gctccagaca ttgagaaatt ttccctttaa gttgcgatgg gaatccagaa 60
aacgccatat ggacccctct atgctgtgaa atacttcagt actcaggaga agtcacgttc 120
tggttgctgc aagcgtgtga taccctgtca ttaaaataag aaatagattg ttatcctctg 180
ccaag 185

<210> 639
<211> 93
<212> DNA
<213> Homo sapiens

<400> 639
cananctgtt nnntcaaatc tgatnnnggc ncactgaccc tgaaaaatgg ctgagctaaa 60
ataaaagctg tgtttataac gctgaaacga aat 93

<210> 640
<211> 267
<212> DNA
<213> Homo sapiens

<400> 640
gcctcacttg tcctctcagc tatcaagata actgttgggt atgaaaactg aactctgtct 60
tagagggttt ctttttccag aagatgcatg tttggaattc tgcaagaact cctgatcact 120
ttaaaatccc aatgccttta ttttcaagat gtacagtttc tgtcttttat caaatagagg 180
agcaaaatct attcttccaa aaaaaggaaa aatgcacaat atccaaataa attttcccca 240
gctgcttnct ggatattgga attagat 267

<210> 641
<211> 324
<212> DNA
<213> Homo sapiens

<400> 641
gcccacatag aaaagctgtc attggcctcc gggtcaggca agagatggga ggtgttcaga 60
gcagcaaacc ctacaagatg ttggaggcca ttcacaagca agcgcctgct tggaaaataa 120
cgtgggataa gaacaatgaa ataatttgat gaggaaagtg ttgtgctaca ttgaatactc 180
acgtcacaaa atgtgcttct acattatgta acttacatgg tcaaatgact ggtacatttt 240
attcctgtgc taatttgtca attctgttcc aagnggaaag agtctaacat gacttttcaa 300
aaacaaaaca agacaaaaca aaac 324

<210> 642
<211> 311
<212> DNA
<213> Homo sapiens

<400> 642
agacgagggg cctcgctatc ttgtccaggc gcgtctcaaa ctcctggcct caagccatcc 60

tgctctccag cctcccaagt agctggaatt acagaaattg aagaatcagt tccagagaga 120
tctcctggag ggcctaggat cacagagcaa agcagaaacc acagctgtct cggaggacga 180
aactccagct cttcacccag agatagtcgt gggctggtgg cttcagggcc cactagggcc 240
tttgttatga gttttctctt cccagcggtc cttttattgc ataatcaata aaccactgac 300
agaaataaaa g 311

<210> 643
<211> 398
<212> DNA
<213> Homo sapiens

<400> 643
gataccttga ctccaactca gtgactacaa agaactgcaa acaggtgtga aaacaagcaa 60
taggtcatct ctggcattac ctgggaattc aagttcagcc ctgcattctc cctctgggca 120
attctggtag agaccatgag gcaacccctg ggaggagcag tagccataac aggatccccc 180
cacagcaacc ccagggctaa gaccagtggg tgcaaaacac cttctttatc aggtgacgcc 240
atcgcctcaa ctcctgcagt ggtcaatatg gtcaatatta agttcacaaa catgggaact 300
tcctgacatc atcacagaag gaatgaaaat gcagttgggg tggctggtac attttaaaat 360
aaggctggtt ctcctgggag ggaaaagggg ttttttt 398

<210> 644
<211> 281
<212> DNA
<213> Homo sapiens

<400> 644
atcatttact ccagggaaga ccagctgcca tgtcacgtgt agtcttatgc agatgactac 60
atgataagga actacagcct cctgccaaca gccatttaca ggtaatagaa gggagccaga 120
agcagttctt cattgctaca ccagacccag aataagggta gactcttgtg atcatcctcc 180
ctttctcaag agctggagac cagatcctac tgaagagtcc aggctctacc atgtatgaac 240
aagggtaact ttggaaaaat tattaaaact ttccaggcct c 281

<210> 645
<211> 364
<212> DNA
<213> Homo sapiens

<400> 645
gtttgcagag aaccagcagc ctgacaacca gccatctctc ctcttgatac cagtgttcaa 60
gcaggctgaa ggtcagaatc ttggcagttt gtttcctaga atatacaaca tcagactgtg 120
cttcctaaaa gtccaggaga gttcttctac gagaagattg gaacttgata gagcagaaga 180
tcagctgaac gctggaagac tctccagtgt gaaatgttta tttctaggat cttctgttca 240
accttggagc cttcagagtc ctatgtatag tcttaaactg ctgatctaaa aatggtgctc 300
tgtttcagca ggtaattaat gatgttacac attttaataa aatttttcag ctagatcgct 360
acct 364

<210> 646

<211> 403
<212> DNA
<213> Homo sapiens

<400> 646
gacacacagc cctcctgaag aaataactca caatcttcct gtgcccggct attgccagac 60
ccttggctga taggagaatg gatgttagct gactgcaacc ttggcgttat cagtactgcc 120
tgtggccctc tccagcacac agcacaggcg ccgtcctata acatccccag caagccctca 180
tttctttgca gtggctcctc ccttgctgac ctgccccttg cttcggctcc tcccttgctg 240
acctgcccct tgcttcggct cctcccttgc tgacctgccc cttgcttcgg ctcctccctt 300
gctgacctgc cccttgcttc ggctcctccc ttgctgacct gcccgttgct tctgtgctat 360
gcacatttcc tactttctct aataaatctg cctttcttta ccg 403

<210> 647
<211> 428
<212> DNA
<213> Homo sapiens

<400> 647
gttgctatga cagccaggaa tttgcgaacc aaaccagacc tggagaagaa gtctctcctt 60
ggcccaaaga gtttgcagtt ccaagtggtt ctgctcatgg ttcctgttgt cttctttgac 120
acctgccaga tggaagaacc tctaaacctg ggatttggaa atgtcccaac agaaaggcta 180
tttccaagct ggctgaagct tggaaataaa ttcgacggaa tttaggtgtg atagaaggaa 240
cttcttggca agaaaagctg gaaaatatta caataggtcc cagagagaac ctcattatct 300
tctcgaaaaa atttctatat ttgtttagtg ttctgtggtt tgctaagcac attcacataa 360
attatctaat tggatcttca catccgcctg gtgaaggagt aaagataggt ttcataatat 420
ttgaccaa 428

<210> 648
<211> 26
<212> DNA
<213> Homo sapiens

<400> 648
tgagtggaag cagcctgagg acctca 26

<210> 649
<211> 161
<212> DNA
<213> Homo sapiens

<400> 649
ccctgctaca tcctccttca agatagaaag aagaaaccct aaacacagag aatgcaagaa 60
gcagaagagg gccccatctt tacagcgatc agctagcaga gtcaaaaagc ctgtgtggag 120
ttttcaacaa agcagaggtg caattttcct tggaaaaaaa a 161

<210> 650

<211> 295
<212> DNA
<213> Homo sapiens

<400> 650
gcacatctgg ataaaggcag aaacaaagta acaagggagg aagtcccagt aaaccaatct 60
tttttctccc aaacacatat tttggggctg acatcatagc cacatggcac aaactacaga 120
tggaaaagta tctgaactca aatccggaaa cttaaccttt atcagatgaa gacaagaaag 180
acttcagcag gcaaactcac acctgttggg ctgaggagct agaaatcaac aaccaaatac 240
caacattact gctctggaaa taacttctgt tagaacaata aagtaagatg agggc 295

<210> 651
<211> 409
<212> DNA
<213> Homo sapiens

<400> 651
atctctctta ccggggggatg caccaaagcc cagctgttca gtgtcaatgg ctgccagctc 60
ccaactacat cccacacaga cgggagccac ctcaatgtct gcgagatttc ctgtccctcc 120
ttttcaatcc catcaaggca ccctctacca atgactgatg gatacaggga tacaaaagcc 180
cagacaccta tcttccaaga ggaaaaaact ctgtggtggt gccatttatg ttccagagca 240
actgcgggat caagctgagg gtggactcca gctgaaacca catgcaacag actgaatgct 300
tgtgccctcc caaaattaat atgttgaagc tctaatccca atgtgatgat ggtattaggg 360
aggtaattgg gtcataaang nggatcccct gttaatggga ttgcactta 409

<210> 652
<211> 309
<212> DNA
<213> Homo sapiens

<400> 652
gctcatagat ggaaggaact tgccttgagt ccccagtaag acactggatt ttggaccttt 60
gaatcaacga tggaaagttt nctgaggcct ccccagaagc agaaaccgct atgcttccct 120
tacagcctgc agagccgtaa atgagagaaa atgcaactgg aaaactggct tccattctaa 180
gatatttaag caaganaaat aatcatagtc tacataatca cagaatagct tggaagaaga 240
tgctactgag tatgttacac aggagcttgt gatcaaatgt aaataaacag gtaacatgga 300
cttgggaaa 309

<210> 653
<211> 434
<212> DNA
<213> Homo sapiens

<400> 653
atgtctcaag gaagtggatg ccaggaatga tgaatcactg aagcctgttg ggggatccac 60
actcgaggca cagatcatac aatctttgag agtaaaagga tggatcaaga ccacaggaaa 120
gaagggatga agctgtggag agtgaggatg aggaacattg cagatgactg gaggccagct 180

ccctgacctt cccctactgc cactgctgca ggccctggtc aggggaagta aaactgacac 240
tagctgttta tcatgcttta agaccagaaa gtaaaatgaa aaccattacc acctctcagg 300
atgcaagaag gcacaagaaa ggactaaacc agttgaagat gttatctcaa tggaagaagg 360
aatcctaatt aaattgaagt cttaacaaaa agacggtcta tttcacaaga ctgatagaga 420
catatacttg atga 434

<210> 654
<211> 407
<212> DNA
<213> Homo sapiens

<400> 654
caccangata actgatccaa gtcacaagca aacactcaac ggaggatgag catccatcca 60
gccacctgtc tttgcctgct ttggaggtga cgcctggctt ntcccagcag cgctgatgga 120
tctgatggtg atttcatacc aggttgcagc ctttagtccc gtcacagtgc ctggggaatt 180
ggccaccgtg gtttcaatga ctgtgtcccc gtcttcancc gtgaggaggt aactggtggc 240
acccggcact gtagcccatt ctacagngat actgttgctg agttttgaat atgcctgatc 300
aatagtgggt atttcaggag ctgaaagagg ttttagagtt gtacattaac caanatacct 360
acgaggatga cttctttcat cattntactc ttcaagctaa atctata 407

<210> 655
<211> 234
<212> DNA
<213> Homo sapiens

<400> 655
gtccngggag actttcatct tcaaactttg agagagagct gagaagcctc ggaaccgtcg 60
cccccgtgcc cccaacccac ctcccggatc cgcgaaacct acaaaactgg atcaccagcc 120
gtctcacgcc actactgcct gtgccaagaa tcccaaactc tactgatttc aagcctgtct 180
tttttccaaa gaaaaaagtc ttatctaacc aataaacaag ctgctttccc tagc 234

<210> 656
<211> 422
<212> DNA
<213> Homo sapiens

<400> 656
cacnacctgc attaagtnac naactgaggt tgatcccagg agaaaacatt ctactcctca 60
gcatgggtct tgcctgattc atttaccaac tatgacactc tcacccagag gcataccaag 120
aaaggaactt gagaaaacca ttccagttaa agcaagttga cccggcacag tccaaaatcc 180
gtgctatgca gcacagtcca aaatccgtgc tatgcagcac agtccaaaat ccgtgctacc 240
cagcacagtc caaaatccgt gcagagctcg tggcacagag gaaaatggac ataaggtagc 300
ggtaacaggc tggcgactgt ggcttttaca cattgcttca cacaaccctg tccaggagct 360
ttacacactc actaaacaaa cagaagacac catccaattc actggagccc cgttggataa 420
at 422

<210> 657

<211> 333
<212> DNA
<213> Homo sapiens

<400> 657
acgctgtgct tggtcctacc taaaatacaa aatcaagacc acccaggccc tgctctaagg 60
aagtcactct ctagaaaggg acagagacat gctatcagga agaaaactga atatccttac 120
attgtgaggt cagatgtatg gctttcattc tgaatgcagt aacttcaaat gtagacacgt 180
gaacagaaag ctttgtaaca gaaaaacagc attgtttcgt tagatgacta tagatagtat 240
ttcataaaat acaagaaaaa cactcaaaat tagctccaaa aaatgtatga aaggtgatac 300
tctgatattt aataaaactg aacctctcac aac 333

<210> 658
<211> 411
<212> DNA
<213> Homo sapiens

<400> 658
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ctgcagcgta atccatggca actcgttact acggcaacca aggaacatgc accagaccag 120
gataaaaccg tgaaatctga tgtcatattt tcataagaca taattgcaaa tgatattcta 180
aagcagattt gttaaacgtg tgatctaaat tataagttaa gttggaagtg attatgaaac 240
cttcattggg actaanaatt aagggtctgt gttcatgcac tcagtgattg ngttcatgca 300
ctcagtgatt ttattgagca cctactatgt gtggcacacg gagatgaata agacatagnt 360
tctcatgnct attcttcccc tcagcccccc tcacctcttg aacagacata a 411

<210> 659
<211> 398
<212> DNA
<213> Homo sapiens

<400> 659
tcagaaaaaa agtaaccaac tggcccaaac agcatgaaag aacaccaggc aaaaaataga 60
agaaatatac cgtatcatca aaaggtgcgt ctgagttgaa gtctctgttg aaaaactgct 120
tattagcctg aagaatctag cagggtcatc agaagacttt tcacacccag ttggttcagc 180
tgtctcagat gattgtactg ccaagaagct cctgtgattc ccagcttggt cccctttgta 240
gaaggccacg tcttcttaac ctaggaataa atgaaactga acagatgcct ataccccctt 300
gtgatatttt tctgtgacac ttaacatact ttgaaaagac cagggaaatg ttcctatcaa 360
agaataacag atatatccac ctgaagcgta tcggcata 398

<210> 660
<211> 211
<212> DNA
<213> Homo sapiens

<400> 660
caaactactg ctttgtccat gaacaccttg tcaacttcaa agattcactt ctgttggaaa 60

taaacagcat gagcagaagg ctgccaagtt acagaaaatt tgaagattct tgaagattct 120
ttgatgacaa caagcttggc agggtggctt cttgatgttg aagtgctgaa aaggcngatt 180
ttaangggtt tnnaatggaa aagggggga g 211

<210> 661
<211> 86
<212> DNA
<213> Homo sapiens

<400> 661
ataanaaaac caggtntgcg gggaaattga gacttgaact cangnctggc ggactgcnaa 60
gntgacacct gtctgctaca agcaag 86

<210> 662
<211> 320
<212> DNA
<213> Homo sapiens

<400> 662
ccattgtctg ggagttttgg aaccactgac tgactcttcg agcaccaggc ttttcccttg 60
gtcctcagca ctgggtgggg agccctacat cccagaagtc ttgggaaaca gggtggagcg 120
gaatcgccta tcacagccaa acaagactct ccaggaggaa atacagcaga gacctgctca 180
gggcttagca aacagtgaca aaggtgaggt gaagccagtc tggacgcaca ccagttcggg 240
atgatctgag gaatgtcagg cagtccctat atcctcagat gtgtncccat ccacctggca 300
catgtctgga acttcccatt 320

<210> 663
<211> 386
<212> DNA
<213> Homo sapiens

<400> 663
gacacacaca cgaaggttcc atctatgagg aatggaccct ttccaaacac tgaatctgct 60
gatgtcttga tcttggactt cccagccttc agaactggaa acagccatga caaaatagag 120
gatgaaaatg ttcaaaagaa ggggataact gatgagggac aaaagaattc cactggaaat 180
ggcaactaca gctggaagag tgaagatctg attaaggaag ggctggacca tcagcgttcc 240
tggcattgct ttcaccccaa caggacttga cctccagtat ctcttttcta ttcatcctgt 300
accagctgct gtctatatgg gctgaaattg tgtctggttt tgctcatcat cttatagcat 360
atagcaggag tgtaataaac aattgc 386

<210> 664
<211> 249
<212> DNA
<213> Homo sapiens

<400> 664
gccttaggtt ccagagcctt accaggatga gagggctgat ggtgacagtg gcagtgaccg 60

gaagctggga gcccttccca aagcccctgg agggaactca ccactagcac gaaccgccaa 120
ggccctgggt gccagcctag tgcccgccct aggagactga catggaaggc ttctggcttc 180
agtcaaatgc catctcactc atttgcctct cctttctttc ttttccagaa ttaaagctca 240
taggatgat 249

<210> 665
<211> 278
<212> DNA
<213> Homo sapiens

<400> 665
cttatatact ttgatgaatc aagctgtcat ttanagagcc tcgtgggaag gactgagaga 60
ggtgtctagc caacagccac tgggcaactg aatcctacca acanccatgt aaatgggctg 120
ggaagcaaat ctttctcagg cttgagatga ccacagcccc ggtcggcacc ttgattatag 180
nctgtgaagt ccctgaaagc agaaccagcn taagtcagcc cagattccca acccacagaa 240
actctgaggt aataaatgtt taaagccact aaaaaacc 278

<210> 666
<211> 620
<212> DNA
<213> Homo sapiens

<400> 666
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agggacacna gncactctgg atggcgngct tgcccggntn ccntgaacnc ttannggang 120
gcnggntgtg gttcnanagg atgtgggctt tncccttac aaanggatag aagtgggagt 180
ttgcctggnc ccccgaccca gcanggactt ttacaagggg accntgaatg cttggganaa 240
actaatggcg aaaccctggg ncctcactta agggcttttt ttgnttgccc naaaccaaca 300
cttgatctnc cttatttggg agccaaggga gaanganccc cggggggccc ttgaattttt 360
gcaanggtgg gcttaaacaa aaaacgtggg ncccaaaacc caacctgttg ccccaaggcc 420
tgggaaatgg ccaaatgggg cttcgaatct ttggggttaa attaaaaaac cctnttgttt 480
tntttggggg ttnaaaaaca aattttttt ntggccttta aaaccccttt tggtttnaac 540
aaaantttt attttgggcc anttttaaan ccccccaaaa aaaaaacctn gggnnttttt 600
ggggggaaaa aaacctttgg 620

<210> 667
<211> 412
<212> DNA
<213> Homo sapiens

<400> 667
aagcagtgtc acgagcaaat cgcagaccag aagagacact tgtgggaaac atctagtgac 60
tcagtgattg cagagatagc aaggaggagg aatgatgggt caggcttcct ccagtccccc 120
atcagaatcc atgggacaag caaaggattc cataaaggca gctgagagcc actgggggct 180
tcctgttcaa aagctggaaa aagttaatca gacccagcca gaagacacta gtggccagca 240
aaaacctcat cctgggggag cggttaaaga cagggcttct aagcaggagc cccgtctgta 300
gctgtgagtc agcatcacca tgtccaaaac aaagtccacg agtgggccaa accccacaaa 360

aacccnngga cttggggttt tntgganant ttanccccc ggggaaggtt tt 412

<210> 668
<211> 257
<212> DNA
<213> Homo sapiens

<400> 668
cgtcgaactg agatcacaag accctggttc cagagcggtc ctgctttaca cccgagggga 60
aaagggaatg gtccntncag aaagggccan aagaatctgg agangaaggc cnatcacctt 120
tggcccggtg ggtgnccatt ctttattgga cctaagcctt aaaaatagac caggttcccc 180
tgggtctttg ggtcttcatt tttgaagact cctgtcatgg taaaaccttt ggattaaaat 240
aaatggtatc atgcatt 257

<210> 669
<211> 497
<212> DNA
<213> Homo sapiens

<400> 669
ttcgtccact gagtnantnc gcancaagaa cagcaggcaa aaggaaaggc accaagtgta 60
aaggaagaat atttgaagca gaacagaaaa taatttctga gcaaaaaggg ctatgtgatg 120
atgcttcatt cagctggtga tccattacac ctgttaagag gccaaagaga actgtagatc 180
tctgaggtcc atgggggcag gggcaaggga ataagatgaa gggaacacta gaataaatga 240
agtgccttaa cagctgaaaa ggctgatgga tgtgctttgc acctcagaag acggaactcc 300
cagcaggaga ataaagagtg caacaagagc agagcctgct agaacccaca cagtnaggga 360
actgatcctc taataacctc tnctttcaga actttataat gngctattaa aaaccccttg 420
tttgngggnt anaaaaccng ggctttaccc cccttaaang gggtttttg gcctttggcc 480
naaatcccca attgggg 497

<210> 670
<211> 257
<212> DNA
<213> Homo sapiens

<400> 670
gaactgagag acgagaccta tgttacccag gctgtatgtg aattcctgga ctcaagcaat 60
cctcccatct cagcctcgtc cctggaactc ccctccaggt gccccaggac ctgagagaga 120
ggtggagtga agggggagag aaaacaaagc ccagggactc gcccccaaaa aacacaatca 180
agaagatgct cccagctttt caatttcaga cactgagctc ctcgcaagat tttgttggaa 240
ggaaagcttc tacagtt 257

<210> 671
<211> 254
<212> DNA
<213> Homo sapiens

<400> 671
agacnanncc tnnggctnnn nggtggcttc ggattccang agggcgccca anaacggatt 60
aactgncagc ttcctggagc acaagcttgn tattagcgcc tatatccttg gtcaagcaaa 120
agtggctctn caccaactta atggtctttt taccacccca ttttctggac gaacgtaatc 180
acaagtaaga accaagaagt gtgcaagtcc ccgaatccca agtgcttcat aaataaaaga 240
atcccagaag cttc 254

<210> 672
<211> 306
<212> DNA
<213> Homo sapiens

<400> 672
ctccactttc cagcctccct tgaccttcag ttggagccat ttggctggag tatgaccaat 60
ggagtatata tagaggtgct gctggactgg gacacatgac cagatgcacc atctcttttc 120
ccttctggtg gcaccacaga ggcccgcacc attaccagaa gcataaccat gaagggaagc 180
accagaaagc ctgaatcggt tgcttggaag ggagaaactn ccagggggcc caaaataacc 240
cagaaaaatc ttaccttgga ttttgcttaa aataagaaag taaaatcttt tattggtgtt 300
aaatcc 306

<210> 673
<211> 125
<212> DNA
<213> Homo sapiens

<400> 673
gtagactgag atgatagtaa cacgaaagga aaattcctaa ccagtgcgca agaaagaaga 60
aaatcaacca tgcataacac tgattttaga taatatctta tccataaacc aacagagaaa 120
atgcc 125

<210> 674
<211> 288
<212> DNA
<213> Homo sapiens

<400> 674
agaactgaga caagagtaaa aaaatagtgg tacacgagat ttggatatca aaaaggttct 60
gcagttaagc tgatcagttc cagcaagatg gaagatcaac ctcaccattc atgaaaagaa 120
aacaatggct ttaagtcacc accaccacca ccatgaagac aaagccaagg acagaaaagg 180
ggtgaccggc cttcgctcag gagtttgtca aaagagttaa aagttggtca ttttgtttta 240
ttgcctattt tatttctccc cgactttaag aatgggtcct aagcttgc 288

<210> 675
<211> 343
<212> DNA
<213> Homo sapiens

<400> 675
agtctnattg atgtgcagca aagcacacca nactccgtnc ttggntggna ttagnttgac 60
acncacccca naccaggtat tcnggcttca accnagggtc tggacattnc caccntangg 120
aaccaggaat aaacaagtaa ggaaaaaact tcactttcga acccttntaa tggacttccc 180
attttcccaa anttggccaa atcaagcact tncncnnntt taccaaaggc ccccttnccc 240
cggacaagaa ttaatnttta aaaaaacntc ttgatcccca aaatgtttcg ggngaggaca 300
aangtttgga agtaacaaat aaaaaattnc caggtctcct tgc 343

<210> 676
<211> 94
<212> DNA
<213> Homo sapiens

<400> 676
tagtcctgca ttagtagact gagtgccatt aaagatccaa agtcatgact gactccaagt 60
atttcacaac ccaataaaaa agggaaaata tttg 94

<210> 677
<211> 456
<212> DNA
<213> Homo sapiens

<400> 677
gactctgggg agctcctgca ttaagtcaga gggngagatg aagaaactgg ggctctgaat 60
ggcatattaa cgcgtgcagc tccagacagc gaggaagtga tggcaactct atccgaactc 120
aaatctgcca gacctatacc agtaggtgcc tgtgtgcagt tggggactca cctctgccat 180
tgctggcatg agctagctgt cttgaactga aaacagacac tcaaagatgg gctgtgggat 240
cccagagagg tggcagaatg gtcaaagcta tgaagccaac agctgctgcc aagaagaaag 300
tcctgagccc tgagtgattg taatttaaaa aacttaatgc tgggagtggg tgtttatttt 360
ggaggagtgg gctgcttatt tttggnttgg ggacttgttc attcatcttt tctcacggcg 420
cctactgctg ccctggnccg aagttaaagc tcaatg 456

<210> 678
<211> 494
<212> DNA
<213> Homo sapiens

<400> 678
agaactgagg aaaaacttga ccaaaggaag ccacccacac tgataattgc cagcctggga 60
gaaatgactg tagaaggcac atccaggccc cactcccaga cccagtgccc aggctccaag 120
catctctcca tactggaaca gcacggcagc tccaaatctg gaactcatac cccgatctgt 180
aacccgtacc tcagacctac atcttcaact gatttcagcc caactgtgag gctaattctg 240
ctttctttct ttggatagag gcttaaaaat aaatataaag aagatgatgg acacgaacgt 300
agattaatac tcttgtaata cctttaagga gtaactactt taatagcttt aggtaataac 360
tactgcaaac actgggatga attggggttt atctgctttt taggtgaggg gaaaancccc 420
cnnccaaaat aaccccncct ggggttttaa ggttaanaat tttaaaantt tnttttnaaa 480
gggttggaaa aggg 494

<210> 679
<211> 246
<212> DNA
<213> Homo sapiens

<400> 679
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atcaaagagc atcgcttctg ccctcaagga gcttcctatg tggaaaggaa gatgtggtac 120
ataaaggatg tggatttctg ccttggtgtc ctgctggtga attctctcca gttataaaac 180
attttgttac cttcattcgc tcttaattaa aaagggaaaa gaaactccta gggctctgac 240
aacagg 246

<210> 680
<211> 447
<212> DNA
<213> Homo sapiens

<400> 680
gcctgataag tacaactggt gctgctggga gacgcttaca ctatagtctg aacttctaca 60
gagccttttc ctactgtaaa cctcactcaa aaatgacagc cttccatttc acaagaatca 120
gagtcttgct atgttgccca cgtggtatca actccnggcc tcaagtgatc ttcctgcctc 180
agcttaccaa agtgttggga ttacagatgt gagccacagt gcccagtctg tgtgtgtttt 240
tataattgga agcacatgac atcttttaca caatatgcaa atgcatattg aggaaggagg 300
gagagcaaat atgtctaaaa gtaatcacaa taagtcttga cccattaact gtcagatcaa 360
aatccacacc aattttagat tcagaagaac actttgtctt ttttaaaaac tntttntaaa 420
acaccttccc ccgntttttt taaaaaa 447

<210> 681
<211> 299
<212> DNA
<213> Homo sapiens

<400> 681
agaactgagg acggtgggtg actggctccc ctggcccttc cttgctctca gcaagagctc 60
ctgccactgc cacagtggaa aaggcctgaa tttgggaaat gaagacgtca gagactcgca 120
acttcttctg aaagcccagc caactttcct acaagcatga ctgcagacgt ggaagagaaa 180
aggcagatgg cctgggttca aagcccagct taaaaacaca tattctagct ttgtgacctt 240
ggtcattttg gttttacttc cctcatctgt aaaacgggga gaataaaggt ctctaactt 299

<210> 682
<211> 500
<212> DNA
<213> Homo sapiens

<400> 682
gctccccaat gaactntatn ctcttcattg gacntgtatg ggattatnga naggaacttg 60
cntacagagc ggnccactag agctcagcca gatcatccta cagtgaagct ctcaggaaac 120

aagtaccatc tacaaggtgc ctaaggaagc acagaggaga gccacctcca aaatggatac 180
cctctccaan ggtttgtagt gaaagaggca cagctcttgg cctggagttg gtgggggctg 240
cgataagtgc aagatacttg gtgacaggaa tcgcgagcat actcttgtgt tgtacggatt 300
ctcagggtcg gccctgcaga ggaaagaact cngtcaccgc gaggtcctgc caacatgccc 360
aaagtncccg gatatgtgtg cngggngtta aacctaaanc cccccccccc ttttaatttt 420
ccnaaaaccc cccaaaaagg nttggggccc cttcctttta ccccccttaaa nggggggggg 480
angntgnttt tttgaataat 500

<210> 683
<211> 360
<212> DNA
<213> Homo sapiens

<400> 683
ggaggaggtg aacgcatgtt ttggcattac atctgggctt ccagccctca tcaaggggaa 60
ggggcttctg actcctgcca gcaaagggac ttagttgctt tcaagtggga ttttattcac 120
ctggacagtc atgcaaccaa atcacaagca gagaggaggc ttccccaacc cagagtcccc 180
acacgtgacc cttaatataa tgtgtattga tgacaacctg aagcagcctt gacttcagtc 240
ctcagganaa caatatgcaa ctctttataa caactggagt ttcccagatt tccaaagttc 300
aaatgaagtg aaagacaatt tctggtgagc atagacatta aaaatgagaa aacaaatttc 360

<210> 684
<211> 469
<212> DNA
<213> Homo sapiens

<400> 684
ggatgaggta ggaagagcgg tggattctac tcctctttca tcatttgacc ttcaacaagt 60
caacctccac tctctgggcc aactcagcaa accaagcccg aggacccgac cacctccaag 120
atccacttca gctccaagat gctacagctc tatttctcca agagccttcc tccagcatgg 180
actgattctc caggcccctt tgtgtgtata ctccccacaa agggacactc acaaattgca 240
ctccaacaag aatgagatta tcctctaaag tactgcgtta aagtgaggat cagggagaaa 300
tgaaataact ctgagagaca cttcctccta tacagaagca agcaagaaac tgggaaaggg 360
aaagtccttc cgaacagaag gggctggaga aaactcataa cacattagcc ttcactctta 420
aagctttcag ncaccaaaga aatgcttgat tccgaaatcg gtttttgtt 469

<210> 685
<211> 310
<212> DNA
<213> Homo sapiens

<400> 685
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cctaaaagct gggaaatgag ccaaggccac ggtgctcagc tgaggagcag gtgtccctga 120
gaacccaaac atcctagagt gtatctggga acataccaag gaaaagagtc tcatcacatg 180
cggcagccaa agagccacaa aatcagctta aaagcagctt anaggcgtgt ggtgggtgga 240
tctctagagt tctcctgatg ctgccccgaaa atgtcctgtt tgtgaatcct aataaactca 300

tctactcctc 310

<210> 686
<211> 97
<212> DNA
<213> Homo sapiens

<400> 686
caccagaact gcagatggat ttccgacgga tgaatcacct tcagcaaccc cagcaagttc 60
tcattaaatg tttaccctaa agtaagattt tatgatc 97

<210> 687
<211> 344
<212> DNA
<213> Homo sapiens

<400> 687
agcaatctcc catctttaac agatgaagct taacacaaga gcagcacaaa aaccgtgaaa 60
aagaaggtgg taaaaaatcc atcttctcag actaccttgc tgatgaaaaa aatagctctg 120
tgacacagtt caagccgatg aggtatgagc agaanagttc tctgactgtc tggaaagnct 180
gatttcctga tacagacacc actcttttcc ccatgcctga attctanatg tgttgataga 240
tactggggca gccatccagg gaccatgagg ggnagaccaa gagaattcca gaaaggntga 300
ctttgttgta acttcaacct ctgaaccact tgcctactct taac 344

<210> 688
<211> 193
<212> DNA
<213> Homo sapiens

<400> 688
tcgattcaaa tgttcttcac agttgtcaca cccacaggat cacaaactca actgaatctc 60
ctttaggtca agtttctgtg gaagaaactc agaaaatggg acctggagaa atactcttct 120
catctaagtt gtcaaaacac ctatggtcat ttttcagtaa ctgataatcc aaaagtaaaa 180
tattaaagtc cag 193

<210> 689
<211> 306
<212> DNA
<213> Homo sapiens

<400> 689
acagtcctgc atagtcctnc tnagcctaat aatcctggtg accaactata cccagcaggg 60
aggacaaagc tcttaacacg aaagagtgag gagaatctct ccattaccct tttacatatt 120
cagggaagag agaatatcgc agtcgctgga aacgaagggc acagcatcgt gttgctgtat 180
ggccacggtt ggccacagaa aggcagaaag tcatcaactg tatggaaacc agacaactct 240
gacgatttct atgcaaggtg actacacctt actcgttctc caagtattaa agatcttttc 300
atcctt 306

<210> 690
<211> 489
<212> DNA
<213> Homo sapiens

<400> 690
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tcctgagggg agactctccg cctgttcaac acagggacac gctgcctccc gtggcaaggt 120
gactgtcttg ctgctgactc gggcaaaaag accatgagaa tgaattcacc aaccagggtt 180
cccttcccnc gtaaatactg tgagaaaatg gatgtcagtc tccagctgac cgcagagaaa 240
tcacggccag gtgttggcac ttacagagaa gaatgaatac agaactgctt taatcataca 300
ctcaggaaac tccccaattg tatcaatgac tctatataag gaaacgaggn ttgggacctc 360
caaacnaact ctntgggngg ccccaagcaa aacaattcac cccaacggng gccctatgga 420
caaganaaac tcctgcagtt attctatttt ctnagctccc tgctcctcgt tttcctcacc 480
ttagcaaga 489

<210> 691
<211> 244
<212> DNA
<213> Homo sapiens

<400> 691
ccctcttcca actggaggct tatcctgtgg ctgggaacat ttcctgcctg gctgcgagga 60
gtgagactaa gaaaccatac ctcaggctga ggagagaggc cgggtttgat atgtgtgccc 120
tggggaagaa aaggagaaaa tgtgatactc tctcatttaa agcatccaca tcaaaaattg 180
aagaactgga ttacattgct gtttacttag tcaagttaca ataaacttga tttccttttg 240
ggtc 244

<210> 692
<211> 237
<212> DNA
<213> Homo sapiens

<400> 692
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cggtctacag ctcccagcag atgggtatca ctatcttgcc cagcctggcc ttcaactctg 120
gaattcaagt gattctcctg tctcagcctc ccaagtagtt gggactgcag gttgcacaag 180
tacacctggc tctgatttat tattgaagac tccaaataaa gaacttgcag aaactct 237

<210> 693
<211> 147
<212> DNA
<213> Homo sapiens

<400> 693
gtatccctga ccattcagga aagagacatc aatgacccga aacaatacaa ggaacacaag 60
atcttcatga atcaaatgat acttggaatg aatacaccaa taagaattta ttgccaaaaa 120

gttactttat taaaacaaat tttaaat 147

<210> 694
<211> 169
<212> DNA
<213> Homo sapiens

<400> 694
cgacagagtt gaaaccagat gggatatcac acaattacaa acccacgagt tttcctgtta 60
ctttaaggac aaaggaagag gacatttgaa aagacagtag tttnagaagc ccttgaaaat 120
acctccatca agaagctctg gatctgcaag ggtgggggc ttttgcatt 169

<210> 695
<211> 429
<212> DNA
<213> Homo sapiens

<400> 695
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ctactgaacc tcaaggaacc catctcctca tcaggaaaaa aaataagctt tatcagggtc 120
tgaactctgt aggtcttcac cacggctcag gaggatgagg agcagtgaca ggccaaacta 180
cgagaaaaga cagagggaat caaactcaac actgtgtcta aacctcctcc accactgttg 240
aggggatcct ggcatcagat ggggaacagc tctaaatcaa aataacctca ctactgtgct 300
tttctgtaaa accaggtaaa gatcaaacaa gcatgagttg aaaggntaaa aaaaaaaaaa 360
aagggccggg gnggccattt angttgggat tnaacnnggt naaanttntt aaaaaggggg 420
ggcccccccc 429

<210> 696
<211> 185
<212> DNA
<213> Homo sapiens

<400> 696
gctgaaacat gactatgatg gtgacctagc tttggccatg caggagatga cagtggcaag 60
agaaggaaaa tctgggtttc agatcgacat catggagcag agctgcgcca acaacctgaa 120
atgcatgctc acagtggcct gttaagaggg acagaaatat aaacattaat gaatgaaacc 180
actat 185

<210> 697
<211> 292
<212> DNA
<213> Homo sapiens

<400> 697
tgtaagaaat gaacagacaa agattaaaag actgcagggt tgaaggaagc tcatggaaaa 60
atgtgcagag atgcataaag gaaggagaaa agtgcagcaa agccacatag aaaaatggcc 120
agaagggtca ctcttagcca ccaccacaca gagaaatgaa ctaaaatgaa aactcacaac 180

tcaggaatat ggaataataa gcaatcagaa acataaatat aagcagtttt atctattcat 240
tatttttatt ctactattag aataaattca tgactaaata aaattattca gc 292

<210> 698
<211> 472
<212> DNA
<213> Homo sapiens

<400> 698
gtcctgcatt ggccaactga ggattcttcc aaacaagagg ccctagtctg tgactgtcaa 60
gccttgccat caacactcct ctttggtgga gagctccctg ttggccctga ggcaggagtc 120
ttctgagatc ttgacatatg ctgggcttga tccaggcctc agtacaggtg aggaaacgga 180
ggcctgtaga agtgaagtga cttgctaagg ggcagggctg aggtctgagg cctggtctga 240
gtccaaaacc cgggcaggct ctgagagctc caccctgctg ccatcttacg tccaggcagg 300
gcctgcaagg gacagcaatg atgcaaagac aaacaaagga agagcaaccc cagccctgcc 360
acaaaaccag ctgggaccnc cggccaaaag gagttattcg acctntccag cctcagttnt 420
tcacttgtnt atgaaaccaa cangagtaaa tatagaatgg gagttgaaac gc 472

<210> 699
<211> 203
<212> DNA
<213> Homo sapiens

<400> 699
agaactgaga tctgaacttt aatactcttc atgcttacag accccggctg gcctctgtcc 60
ctcaccattc tgtgtctaga aaaagcagtt gagaacccat attcttcaag aacccttccc 120
cattaccaaa caccatatta ttatatttaa tctacccttc agttcttttg tagccaaatt 180
aaaatgtatt actctgaaga aag 203

<210> 700
<211> 372
<212> DNA
<213> Homo sapiens

<400> 700
atgcgggaga gaatatttga ccttagattt gtccgcctgc atctttctcc tgacgccaac 60
ctcagttcct cctctgactg cctctctcca tctgtattgc aaaacaccaa actctctgcc 120
aaagaacaca tccaggtgtg gccatgtgac tgagctctac tcagtgagaa ctgttgtggc 180
acgttctgga cgatgcctca gtgaggcgat gcgcatcttt tgccttccct ttgtctcctg 240
ggaagtgatt ttgaggatag aaggtatgcg ctgaggatga tgggacagaa tcatgaagcc 300
tccatccaag acttcgctcc ttcctatgga tttcttttat gngggaaaat aaataattgg 360
ggggggtgga aa 372

<210> 701
<211> 396
<212> DNA
<213> Homo sapiens

<400> 701
gactctggcg agctcctgca ttacctcnca tctgtgactc tgaggggaga aagggaatga 60
catccaggac aagaacaaag aatagaagag gaaaggtgct gctacaagtt ggaaagaagc 120
agacagaggt ccctgctgat tctccaaata tgtgtctaat ctgtttactg agttccatag 180
cacttggagc catccatgcn aaaatctgta gaagagcatt ccaggaagag ggaagagcaa 240
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gaatagcaaa aaaaaaaaaa aanggcgggg ggggnnngnc catttnggtt tnancnnnnc 360
cnnnnttttt ttnagggggg gggggccccc cccccc 396

<210> 702
<211> 495
<212> DNA
<213> Homo sapiens

<400> 702
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taggagtgat gtactatgat gggctgggga ccactctaga cgctgagaaa ggggtggact 120
atatgaagaa aattcttgat tctccatgtc ccaaagcaag acacttaaaa tttgcagctg 180
cttacaacct cggaagagct tattatgaag gaaaaggngt taaacnatca aatgaggaag 240
ctgaaagact gtggcttatc gcagcanaca atggaaatcc caaagctagt gtgaaggctc 300
aaagtatgct cgggctgtat tactcaacca aggagcccaa aggggtaaaa aaaggcnttt 360
tactgggcnt tccgaagcat gtggcaatgg aaatctggag tcccagggtg cacttgggct 420
catgtacttg tatggacaag gcatccggca ngatacggaa gctgccctgc agtgcttaag 480
agaagcagca gaacg 495

<210> 703
<211> 369
<212> DNA
<213> Homo sapiens

<400> 703
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gaaggctgtt aagaaaaaca tcactgcaat gcctaataaa cagacatggg tcccagaccc 120
aataagagtg aaaccatccc cctatttaaa tgaaattatg gctgatgaga aagacaaatt 180
aatttctctg tccctagtat tacacaaaac tttggatgct gccattgtta caatttttatt 240
ttccccagga gctcagagtc ccaccttcat tctttttgtt taatgcttaa gcttgcctgt 300
ccacctatgg aagactagaa tgagcaaaga ccatgtattc aatgatctgt aaatctaaca 360
ggaaacaat 369

<210> 704
<211> 153
<212> DNA
<213> Homo sapiens

<400> 704
gtgtgatgga tggagcattg gagcaaccac aagggaaaat aatacagaca tgaagaaaac 60
agtaaagatg ctgtccctga catcattgag cagtcagcaa ctgcccacta ccaaacttat 120

tgtcatgtga aaaataaaaa cctccaattc ttt 153

<210> 705
<211> 131
<212> DNA
<213> Homo sapiens

<400> 705
atccaggagg taancaatca actaagagcc aggcaccttt ttaagtccag taagaagaaa 60
catttttaca acctgctgtc tctgaagtct gctatctgag attcctctcc acaataaaac 120
ttggtctcca c 131

<210> 706
<211> 323
<212> DNA
<213> Homo sapiens

<400> 706
atcatccaca aactacaagt aacatgtagt tacaacatgg ggctcagaat gtaccaagat 60
catcctatgt ctacagaaag gagtaaaaca caaagactaa acagagttac ctatttcttg 120
ttagcctgag aaaaattctt ttcagatgtc tttcattacc tcagaaatgg aggcaaatgc 180
tttaagaagg gtcatataat actttgaaag gctattgcca tggtgtggtt attaagctct 240
tgggaaatga tgggcttctc ttcaagtata aggaacaatt gtgcccccta agagtcatct 300
tgaattggaa tgaaataaac tgg 323

<210> 707
<211> 273
<212> DNA
<213> Homo sapiens

<400> 707
gacctgcatt aaggtcgact gagtttaaga ttccccagat gccttggata atttgttttg 60
gaaaacatat attgaagata ccnagagcca cagtatgaca gaagactagg tcccagaatc 120
acaactggaa ggaaagtcat gcactaatga agaaaacaat tcttaaggct tatatgagct 180
gaaaacaaac ttctgtcatg ttgctgcctt tatccatttt taaaagatgt ttgtcatcag 240
tggtgctact ctaataaaat acatcatgag cac 273

<210> 708
<211> 390
<212> DNA
<213> Homo sapiens

<400> 708
gcctgacaaa ataagtggct gtgctcggaa agcccaagtg acaatgaagt ccaggtaacc 60
tctaggaatt gcaggttccc tcttggagct gaggacagtc tccagtctcc agccagcaag 120
aagccagggc cctcggtcct actgctgcaa ggaaaggaat tttgcctgtg cccggagtca 180
gagtggaagc cagttcttct ccagtgaatg tgaacgcagc ctggccagct ccttgatggc 240

aggcgtgaga ccctaagtgg gggactgagt gtacctggac acctgatcca taaaaactgt 300
gagaaaaatc tgtcttgntt taaagncncn tccnttgggg gcaatttgca gcattaaata 360
attaagtaca agtacatgtc acccaaggtc 390

<210> 709
<211> 430
<212> DNA
<213> Homo sapiens

<400> 709
aagtctcaac aattaaaaga aaattagaag ccaagtgcag tggctcacac ctgtaattcc 60
agaactttgg gaggccaagg tcctgcatac cactgaaact actgatgtca gctttctgaa 120
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ccttaccctg accaatcaat ggccctaatt tttggtcatt ccattttctt gccctccatg 240
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cctctttgct gggaagctta tgatcattaa actatttctc tgntgcnnnn nnnnnnnnnn 360
nnnnnnaaaa ggggcggggg ggccanttnn gttngnnttn aancgggngn nttttttaa 420
aagggggggg 430

<210> 710
<211> 473
<212> DNA
<213> Homo sapiens

<400> 710
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agaaatggat ggaaccacac gtatatgaac aactgatttt caacaaagat aaaaaggaaa 180
agctcaccta tgaaagagtg cttctctcca gccagacaat aggagtaggg aagagaccga 240
tgctgaatga ctcacgaaaa tactgcagga aatgacagga ccgtccccag aagtcccttc 300
cactggcttt tgccgggctg nttcattaaa anctggcagn aaggatgaat cncaagaaaa 360
aggcttattg taacctcaca tcataaattt tataaaactg cttcataaaa aataaccttg 420
gggtccagga actccactag aaaaatgtnc aacctgtctt caaattgggg aac 473

<210> 711
<211> 464
<212> DNA
<213> Homo sapiens

<400> 711
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ttttttggtg nanccnagnc cggggggtcc gnantngggg ggtnttnggc ntannnnnnt 180
taaaaaatga anccgcggac tntcgcggna ctgcnctgng cagggnaaaa aacagtcntt 240
ccgganccnc ccanccnggg gttggaaacg tgctccgtta cattccaact agatggggtt 300
tctctctgtt gtccaggctg gagngcaatg atttgaaaat tggnnncctt taactcttga 360
gctcaagcaa tcctcctgcc tcagcctcct gagtattntg anagtatagg tgtgtgccac 420

cacatccggc tccactttt gttttggaag attcccctca acat 464

<210> 712
<211> 316
<212> DNA
<213> Homo sapiens

<400> 712
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gtgaaggacc ctaacaccac caccaccctc accaccccctg ttgtcccgca tatccacagc 120
caccatggtt gccttggcca gcagaagccc aaaactgagg gcccttgtga aaccagctgt 180
tggaatatat aataaaggag aagttcattg gatgctaact caaacaggac caatgaaata 240
gcaacatgtt ttcactatcg ggtacgtgtc ttggtagact cacggtaaat gtttaataaa 300
tatttgatga aagaat 316

<210> 713
<211> 513
<212> DNA
<213> Homo sapiens

<400> 713
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ccattgcgtc cccttcctgt gctaaacctg tgcaggtgct gccggacttc ctggacataa 180
gaccctgtcc gggcactcac caccatcatg cttgaggccc tgccctggtg tcagtctttc 240
cacgatgctg actggcagtg tgtcgggaca gtccccaggc aggcctcccg gatacctgtc 300
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aagnactttt anttnttcca aggctntacc tgggtggtgg nggatgctgc tgtcactaga 420
aggctactgt aaataaagcc tgcttaatct ccttaacccg gatggcttgt gtcaaccggg 480
ttggagccgc caggaaacag cccatgcttt aaa 513

<210> 714
<211> 323
<212> DNA
<213> Homo sapiens

<400> 714
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gtgatttggg cacggcttgg tggaggcagc tcatttctgc ttcacgtggc atcagctgag 120
gtggcttgcc cagaggttgc agaactcgcg tccaggacag ctcactcatg tggctggcaa 180
gttgatgcgg tctgtcagct gggagctcag cagggtattt ggctgggggt cttggttctc 240
ctccacatgg gcttttccac gggttgcttg tgcttcctca tggcatggtg gctaagtccc 300
aacagtaaac gtcccaaaag aac 323

<210> 715
<211> 320
<212> DNA

<213> Homo sapiens

<400> 715
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ggcagggaac tggatgtctt ttgccnacag ccnagaaang gatggatcct ttttactacc 120
ccaagaaatg gagttgggag cagaatcttc cccaagctga gcctttcaga tgagaccaca 180
gaccatgcct ggcaccttgg attggcagcc ttcttgagaa gacccttaaa gccagaagac 240
atccaactac acccattgcc tcaagttgct tgaccccaca agatacccat gaagataata 300
aatgttgtct taagctactg 320

<210> 716
<211> 251
<212> DNA
<213> Homo sapiens

<400> 716
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gctgaatgga gaggtggtgg agttcgcagt ctgtcccagg cactccctca cccagctatc 120
tgccaataca ccactttgat ttatctattg taaagctttt taaaagtgtc ccttaaagta 180
gcttaaggac aaatgtgaat aaagcttcac agcaagtgga gatgcagcct gaagaggcac 240
gtcataagct c 251

<210> 717
<211> 93
<212> DNA
<213> Homo sapiens

<400> 717
atctcccata aattcccaac atcaactatt taaccgtatc atctcatggt taaaaaaaga 60
aaaaagaaga agatgatgat gaaagaaaag aag 93

<210> 718
<211> 470
<212> DNA
<213> Homo sapiens

<400> 718
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nangcatccc acggtgggac gtttanatca agaaagctnn tgannaagac atttgtnaaa 120
gggcaacctt gggtgantgg gggaaattat ttctttttna tcaacccctt ctgcaataca 180
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ccaaggctgg gagtgcagnt ggcgcaaatc cccgggntta ctgnaaacct nccgccttcc 360
ttggtttaaa ggggaatttt tcctggctta aancctnnct gaagataact tgggaanttt 420
nanagggnng gngggaaaan ccaaaaaaac cnngggnaaa attttttttg 470

<210> 719

<211> 417
<212> DNA
<213> Homo sapiens

<400> 719
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cggagcatcc cacgaacggg aacaagnttg ggaacctggg atttggcttc ggtgacaccc 180
taagcaaccg gggtgaagaa cgcttaagct ggggaatccc gctggccttc tgntcatcaa 240
agcctgtctt ttcaccggcc aaccttncca acccctaagc aacccccgc ttcccaggaa 300
aaataaagtg ccacccacgt cgcttcaata gcaccggccc aaaaaactcc cactttagtt 360
cctggaaaaa ttaagtcccc ggcanggggg cctttttttt tttttaaagg gtttttc 417

<210> 720
<211> 161
<212> DNA
<213> Homo sapiens

<400> 720
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tgcagataac gggacttctc anactccatt agtgcatgag acaattcctt aaaataaatc 120
tgngtgnatg ttattgnatc aataaaatat atatgtatcc t 161

<210> 721
<211> 485
<212> DNA
<213> Homo sapiens

<400> 721
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gaaggcgaca tgtctttcat gtgggccatt caatgagaat gtgggggacc cctggcagag 120
atcaggaggc cccaaagagg agatgacaga gcagagccca agagaagcat ccagaggaaa 180
cgtttcggat gactcctccc ttctccggcc agccacttct gaaggagggt agcgcagggg 240
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cctggacaga tcaccacttc gctgagcctg agtcctcatt tggaaaacag gggaaaaaat 360
acttattttt taaaaanaca tggntngggc attaaaatna attnttgcca nattctntan 420
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ccttt 485

<210> 722
<211> 290
<212> DNA
<213> Homo sapiens

<400> 722
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ttgttgggca ttncaagcca caanccctna agcttgaggg tcaagaagct nacaagccag 120

catttaacca ctaaccccac caaggtggaa aggggaagac tttcgaaagc cttcaaaact 180
tgccccaagc ttaaatggcc aaggtgggga agcagaagat gaagttgtcc cttgcttgaa 240
aatttgcaag actcatgaag ccaaaaataa aatgtaagtt tgttttaagg 290

<210> 723
<211> 629
<212> DNA
<213> Homo sapiens

<400> 723
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ctgncctgnn tggnncaagg ncaggtgggc accctttnac cccgagaaag aatntttnaa 120
tgggcaaagg ggnatttttn nnccaccccc cttngaccna ggaaaccccn aaaatgggcc 180
ccaaaaacca gcaaccnagc ctttacaggg agacttttca agaggaggag gaattttggc 240
cccaaaataa aaccacttgg tggggaggta ttttgggatc cccgaagaca aaagaaaacc 300
ctttgcacaa agatccctca ccttgcaaag gacaccattt cgctaaagcc catcgggagg 360
gggcaagtcc cagggcccgg gaaaaaagca aattttggac ctttctcctt gggccggaaa 420
caccaaaaag ccaaaagttc ccnggggaaa aaagnaangt tttaaggngn ttaaaagagg 480
catttttnt tnggactttn ccacggangg ggaaaaatac ttttccaaag cccaaattnc 540
cggggcccgg gcaccaagga attttttttg gntanggggt ctttcaaggg gaagcctntt 600
ggggcccaga aanccaaaaa aggtttggc 629

<210> 724
<211> 149
<212> DNA
<213> Homo sapiens

<400> 724
agaactgagg ttgtactggt cagtggacca tngtggaccg ctgggatntt gggcaggggt 60
gccntgggat gangggcggg tgggaccttt tatatnatgg ggaaagcact ctcacttatt 120
aaagatcttg gnaaatattt aaaaaattg 149

<210> 725
<211> 113
<212> DNA
<213> Homo sapiens

<400> 725
tgttcctacc tggctcaagg aaccctgctt ctctaaaggg ggagcgctgc acccggattt 60
tggtctttta cgttgggcct cagctcactg tcagaataat ctttctaaaa cac 113

<210> 726
<211> 366
<212> DNA
<213> Homo sapiens

<400> 726

cccagaccgg tgggaacccc cntagtcctg cttatttngg cntgaggaga ggtaggctnn 60
cgancttnnc nnnaaaaaat gggtttttc tnacattggg aaantctgac nccttctnag 120
aaaataaagt ggcttgtgtt gnccaaaccc ctttaaccca agggaaaaag tccncgaagg 180
ancctctttg ngnactccta aagccttatt ggaccagggt accttncttc nccccaaggg 240
agaanccttg tcttgttcca ataagtggaa gacaaggtgg gaagaaattt ttttggcgcc 300
ctaccntttt tttcccattt tcaaaaaaag aaggctgggc catttgntta ccnttcttgt 360
ggatcg 366

<210> 727
<211> 167
<212> DNA
<213> Homo sapiens

<400> 727
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attactactc ccccactctg gaagatgctc acaaagccac cagtctcaag aactatattc 120
atcacccttt ggatgggttt ttttttttaa ataaaaaact aaaaacc 167

<210> 728
<211> 213
<212> DNA
<213> Homo sapiens

<400> 728
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tcacgaacac tnngnactnn ttcatgggtg cagtaagaag atggaatcat gaaccaggaa 120
gtgggtcttc aacagaccca cctctgccca caccttgatc ttggacttcc taagcctcca 180
ttaacncnga gaaataagcg tgtttttttaa acc 213

<210> 729
<211> 451
<212> DNA
<213> Homo sapiens

<400> 729
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aaaggagtcc agtaaaaggn nngagcagct tcagggccca tggctacccc catgcaaagg 120
aggtgaggcc acagaaccga actggggtct gttcgcctgg cacagcaaaa gtcaaacact 180
aacattagga tggcagcgag aggaagtgaa gcatttattt gcaagcacca agcaaacaga 240
gttggacagt tgatgcctaa gatcccacct gcccggtggc ttgcagaatt tcaggatagt 300
ccagggatca ccgaaagaga tcaccaaact ttctctatga agaaccaaat actaccaacc 360
ttccgtnttt gccggccncg nggcttttga acttaactgg ntaacttttc attaacgnga 420
aagtagccnc ggnccatatg ccaaaaaaaa t 451

<210> 730
<211> 542
<212> DNA

<213> Homo sapiens

<400> 730
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aataacctgg gcctgggcag caacatggng nantgaaaaa aaagcaggct ttggaatgga 120
taaaactata cttgaatctc tgctctatca ccttatcatg ttatggcaag ccagntacgg 180
aacctccatc atttgncagt gcctaactca gcttctcgcc tgctggncan gctctggaaa 240
gctgagtgaa aacagaaagc agccagaaag ngctgtgggg acaacttgca ataagtgtca 300
catgggcctn ctcctctttt tatgtgcccc atgtccancc tttttccttg gtggccnctt 360
tccanaaaac ttttggaaac cattgggcca aagttacctg gaaattttcc cttgggcctt 420
tnaacctttt gaccattttg gtaaaaggta ngaaatgga tnaaaagcct tttaagggnc 480
caaagggcag gngggggctt caanccccctt gggcttgggg gtaaatgggg aaatcaattt 540
tg 542

<210> 731
<211> 267
<212> DNA
<213> Homo sapiens

<400> 731
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ttggagttcc tggtacagtc aatgttgctt ccctgtcctc ttgcttccaa tgcttggagc 120
cacaacagcc atatgcaaac atgagtgaca ggccaaaaat taatcataga gacatctgtc 180
ctgataccac cacgccagtg aatcaatacc agcaacactg caactctgct tattatgaag 240
gaaaaataaa gctctgtttt ataaagc 267

<210> 732
<211> 755
<212> DNA
<213> Homo sapiens

<400> 732
gggaaaaaac cttgggaagg gccctttccg gcccgggggg tttttgggaa ggggggnaac 60
caaaaaaaac cttttccttt ttttttnggc cngggggggg cccttttttt tttttcccaa 120
ggntnggggg gggggggggaa aattnccggc naaccccccng gggntaaant tcnncggaaa 180
aattaaaaaa nancccccttt ttttttggt aaattggnaa aaagaccccc cgggnncccc 240
aaccccccca aanttggngg ggggnaaata ccngggggggc cccccaantt ttttggggna 300
aacccaaaaa agggnaaatt gggggggaaaa tttttngggc gaacccggcc caaaaggggg 360
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gaggcagcgc ggtatnntgn tngcccacag cgtctgccac tgtctcgacg tgtactgaca 660
ggaagggctg gctnttttgg tnaaagcggg caggctctgc atntaacttg tttgcgnnaa 720
gatcatatgg tgangaanac gggggtggat acctt 755

<210> 733

<211> 367
<212> DNA
<213> Homo sapiens

<400> 733
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cacacacagg cgcacctccc agaggccccc gacactncat naaggnaaga tcgnagcatc 120
ccacgacggg aacaagnttg ggaacttggc atttgcctcg ctgcacctag cagccgggtg 180
aagacgctta nctggggatc cgctgctctg tcatcaagcc tgctttcacc gccacctcca 240
acccctagca accccgctc ccaggaaaaa taaagtgcca cccacgtcgc tnaatagcac 300
cgtccaaaaa ctccacttta nttctgaaaa attaagcacc gaaggagcct ttttcttttt 360
gaagggt 367

<210> 734
<211> 484
<212> DNA
<213> Homo sapiens

<400> 734
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gaaatgcnat agagctaatt taagntctag atcatgatag cctgggatat gggtatgaac 120
tgntattggt cgggatttcc tggaccatca tatggnaatg acagnttgnt atgtaatgga 180
gatgactgcc cagacctatg taaaaattta agtttctact aaaaatattc ttcttgaagc 240
ttatgagact attttcaagg aaataacttc ctaaagaaat aggcccctgg tgaaacacca 300
gggaataaag gaaataaatt gagaaaaatc cnccaggctt atttttattg ntnccnttnc 360
ccggggggttn aaaggaattt ttaattaaaa nggttcacan aaaagccctt ttcatttatt 420
ttaaaagatt ggacatattt tgnccttttta cttatagcta gagcacncat actgggaaag 480
gtta 484

<210> 735
<211> 192
<212> DNA
<213> Homo sapiens

<400> 735
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gaagcaagag actctgtctn caagaaaaaa gaaagaaaag gggtatttaa gctccagtca 120
tctggccctt tcttccatct catattttgg gnggcttctg tcacataata aatatgnatt 180
cattttctcc tg 192

<210> 736
<211> 271
<212> DNA
<213> Homo sapiens

<400> 736
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ccaccagaga gggcagagtc ccgcaacctc ccaccacttt gaaggagctg gagctccttc 120
aaagcctcat tcaaaagaaa ttgtcattat tttacctatc tggtgtttcc cgggaaccct 180
acttgcaagg ctggctttat gtgattaaag ttcatcagtg taaaaaaacc ttttccctag 240
tatgtttgtc aaaaacaatt aaaggtaatt g 271

<210> 737
<211> 210
<212> DNA
<213> Homo sapiens

<400> 737
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attgagcacc tactgggtgc cagatactcc accaggctct gagaggacag aaatgcataa 120
gacacaattc ctgctctcaa ggaggccttt caaaaagaag agagtagaaa aaattcacac 180
atttccccca ttccaaaatg acatctgaag 210

<210> 738
<211> 389
<212> DNA
<213> Homo sapiens

<400> 738
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tgtggagatc ctacatctct gggtcctgtc agtgtttgtc accagcctct gacgtgcatt 120
tataatcatc tgctggacat ttctacctgg gaaatttgaa ttcttggtat tttgcataat 180
gtgttccaag tagagctaat tgtaagtcct tccaaagaga atgctcatca tctttttttt 240
gtttactcaa aaagtcccac catacaataa gctcttcaag aaagatttgt acttatgacc 300
ctgaatgggt tagtgtgttt atgctttgtt tagaggcatt gaattttgtg cattcaaaat 360
acctgaaata ataccatcct ggaccggtt 389

<210> 739
<211> 214
<212> DNA
<213> Homo sapiens

<400> 739
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tagacactgg catccgttag aactgctgca agcttaaatc aaacagtcac ctggaaggaa 120
caggtctctg gagactcccc tctagctctg agatctgtat ttcacagtta tttgaggcac 180
tgttaaaagc agagaataaa atagttgaaa attc 214

<210> 740
<211> 216
<212> DNA
<213> Homo sapiens

<400> 740

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gccacctgtg atgggcatga agctagcatc catgaccaga gttttgtgct gttgcaccat 120
tacaaaatga gcacaggagg gtggacggga gctctctgna cccttcactt aattttgctg 180
nggaacctaa aactgtttta aaaataaagt caattg 216

<210> 741
<211> 473
<212> DNA
<213> Homo sapiens

<400> 741
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ngacagaacc ttctgagctc tcctttcctg ctaaatccca ggcacatgct ccagattcct 120
taggcaaagg aagaaatgaa aggagagaaa gagaccaaaa ttttaaactc tattaaaaag 180
gactgcctga tatttatacc caaaagaacc aatgatgcca tgggatctaa ctaagatatt 240
aacagatatg aaaagagatt caacagagta gaggagcttc agatatatac ctgtcgtggg 300
ttggctctgn gcttccccca aatctcatgt caaaatggaa tncccacccc ttgaaggang 360
ggcctggggg gaggngattg aatacgggan cnacttgncc ttgcttttnt agcgatggag 420
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<210> 742
<211> 764
<212> DNA
<213> Homo sapiens

<400> 742
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cgaataaaag cttttggaat ggaagcccgg ccacccattg gggaatccgg gcccatttgg 120
aaccaaagaa tgggaatttg gcaacgccaa gggtttcttc ccgggcccgc tttggggggt 180
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aatccgggct tggcttcttg gaatgcccgg cccgtgttcc cgggctggtc aagccgccaa 300
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cttggcccaa cgaacggggc cggttccctt tgcgccaagc nttgttgcnt cggaacggtt 480
tgtcacttga aancccgggg aaanggggaa cttggcnttg cntttttggg gcccaaaaan 540
gggcccnggg ggcaaaggna atcttnccct ggncnaattt ttaaaccctt tgggtttccc 600
ttggcccgga ngaaaaaagg naattcccaa ttccaattgg ggnttgaaag gccaaaatgg 660
gcngggggggg ggnttgggaa ttaccnccct ttggaattcc cnggggttta accctgggcc 720
cccattttcg naacccaacc ccaaagccgn aaaaaacaat ttgg 764

<210> 743
<211> 571
<212> DNA
<213> Homo sapiens

<400> 743
agaactgagc attttccaga ntattcaang cttcangatg ggcctgggat ctcactnacc 60

gtttgcccat acttgncgct ctattggccc acaagactcc aaaagacagt gatgataaag 120
gaagactagg agtgaaatct aatctctgta acattcctag atatcaggaa ggtcagaaag 180
cagaagttct aggagcctgg acatttgcca ccaatgcctc tatgtagcaa tcctccttga 240
taaatgccca taaacagaaa tcaggagata atgggttcac ggaaatgaga gactagactg 300
cattttgctt ccagcccaag cctaacaaag gcagggaaaa aaggcttcat ttaaatgaga 360
aacagagtcc tggaatcaaa aagctcttta ataacataac actaaattta agtcagaagt 420
gggtaatttt acttttgcat aatgattgga ctcatagaca tatctagtag aaggttgaat 480
aatttgaggt tatacctggg atgagtaaaa ggtttaaagg atcagatcaa aaaaacaaaa 540
gttcaaatta aaaagagaag gttgtgactg c 571

<210> 744
<211> 396
<212> DNA
<213> Homo sapiens

<400> 744
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gagccataac ccgaggtccc ccacccccggt cattnccanc aanaaaaccg ggtccttgga 120
ccaanccacc acccagccaa gcttnccaag ggcacatgaa ggggaagtcc cgcccaaaga 180
tcaagcaagc ccgggcaaag cttgacccac aagcccaact tgcaagacgc catgaagcaa 240
agcctttaaa gcaagcttga aaatccacca aagatcaaac ttggaaagtc tccaagttct 300
tggggtgcca agtatttctt tgtttgtatg cccaanaaag tattgggggg ctcttttgtt 360
aatttggatt aaattaaata aatcattggg gttaat 396

<210> 745
<211> 211
<212> DNA
<213> Homo sapiens

<400> 745
ggagtatgcc tttgatcttc tgaaacaacg cagaaacgga cccggtctcg catgctgagt 60
tagaagaact ggctttgtca acatcttcct gattcgattt cacggcagat gttgttcttg 120
gaaccctgtg tgaagcattt ttagnatgag ttgtaacatg cacagcctgg ctagtaatga 180
gtttattaaa ctgctgctta tgtgtcttgt t 211

<210> 746
<211> 527
<212> DNA
<213> Homo sapiens

<400> 746
ggctacctgc acgagtngac ttgagggatg cttctcatgg atgcngtagg gncttttcct 60
caaccntatc ccactnaatt aatggcncgc tgatcacaag tgtnatgaat agaaagccna 120
ggnaacatct taactttgca tgaattttat tttggctaac gaaggctctg cagaatcatg 180
aagcaaatga gaaagatgat agagctcctt ggcggngaag cagatatatt gagaagatga 240
gaataaagac aaccgttgaa aacagtccag gaaaataaaa agcctggaca aataggatag 300
tttgctgctg ccttattact ctgccattgc ttcatgataa tcagttcttc atggcttctt 360

catgcctcta atcaacagac ttacttgtgg acatacaaaa ccaagaatct agtccagtaa 420
atttgagggg cttcttggta cctcaccaca actaccttct gttaattaat gngcaaatct 480
ttgaagaaat tatttgaaac cttgtaaaag gtatgattgg gaaaaat 527

<210> 747
<211> 198
<212> DNA
<213> Homo sapiens

<400> 747
gagaggcaca acaacgattc tatgccaggg gaaagccgct gggcctgctc cgccctccaa 60
ttaacccatt ttatctgaga ggctggaaag gaagaaggta caaggccagg ggctcagcta 120
tgaaaacatg ttctgaatgg gataaaaaca gcagtgggaa gcctctgtct tatataaata 180
aatagtagat gttaaagt 198

<210> 748
<211> 909
<212> DNA
<213> Homo sapiens

<400> 748
gtagaactna acntngcggt tgaggacaaa actcttcgcg ggnctttttcc aagtgggggg 60
aatcgaacgg gtattcnnaa taaagctttt gatggaancc cccccccatg nggaatcggg 120
gcatttgaaa caaagaaagg gaattgncac cgccaanggt ttctttccgg gcccgctttg 180
gggtgggaag aagggcttat ttcggctatt tgacttgggg caccaaacaa gaacaaaatc 240
ggcttgcttc ttgaatgccc gccccgtgtt tcccgggctt gtcaaccgnc aaaggggccg 300
cccggtttct tttttttca aagaaaacga accttgtccc ggggtgccct tgaaatgaaa 360
cttgcaaggg acgaagggca agccgccggg ctatcgttgg ggttggccac agacggggcc 420
gtttccttgc gcaactgtgc tcgaaccgtt gtcacttgaa gccggggaag gggactgggc 480
ttgctattgg gggccgaaaa tggccggggc aangatctnc tgtcaatctc acctttgctc 540
ctgcccgaga aaagnaccca tcatgggctt gatggcaaat agcggcgggc ttgcaatacg 600
cttggatccc ggcttacctt ggcccattcg aaccacccna agccgaaaac aatnggnatt 660
ngaagccgga ccaccgttac cttcgggaat ggnaaccccg gtctttgtcc aaattcagga 720
atgatttctg ggaacnaaaa aaaacaaatt aangggggct ttgcgccaag ccccnaaaat 780
tggnttngnc canggcttta aangggggcc gccaatgncc cccnanangg gcgaagggaa 840
tttttcgtcg tggaacccca ttnggcgaan ngncccngnc nnttttttcca anaattaaat 900
gggggggga 909

<210> 749
<211> 342
<212> DNA
<213> Homo sapiens

<400> 749
aggactgggt ggaggctatg tccgcctccc ctggaagccc tcaaggaccc acagaagtct 60
cgagcctgcc agtgtgcagc gggggacaca gatccgccct ctgcaccggg agcatcatgt 120
gaagtctaag aaagccctgc aggaccagcc gtctcacact tgtcgtggaa aatcccatca 180

gcacacctct gactcccacg tgggaatcac caggccatca ccatcaaacc gccctcccgc 240
aggcaaaaac ggcaaacgca gccctcccat gctcaaggga ggtctcatcg ctctgccata 300
gtcctcacaa atctccaaat acaaccaaga tgtgtctccc cc 342

<210> 750
<211> 216
<212> DNA
<213> Homo sapiens

<400> 750
gaactgagag acaggatctt gctttgtcac ccanggtgga gtgcggcagc acaatcatag 60
ctcactgnaa ccncgaactt ctaggcttaa gtgatccttt tgacttaacc tccagaacag 120
gnttttaagt catgtgcaaa gaacttactt ctccatactg gaagtagaag tttctcaaaa 180
atttaaaagc aaataaactt atacgtaatt tacttc 216

<210> 751
<211> 875
<212> DNA
<213> Homo sapiens

<400> 751
ctcgcggttg agggacaaaa ctctttcgcn ggcttttcaa gtgggggggga tcgacgggta 60
ttcgaataag cttttgatga aacccgcccc ccattnggga atcgggncca tttgaacaaa 120
naatgggaat ttggcacccc aggtttctnc cggcccgctt tggggttggg aagaaggcta 180
ttcggctatt gacttggggg cacaaacaag acaaatcggg cttgctcttg atgcccgccc 240
gtgttccggg cttgtcaacc gcaanggggg ccgcccccggg ttctttttg tcaaagaccc 300
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ttcgtgggct tggccacnga cggggccgtt cctttgccgc caagcttgtg ctccgacgtt 420
tgtcacttga aagccgggga aaggggactt gggcttgcta tttggggccg aaaagtgccc 480
ggggggcaag gatctccttg tcatctcacc tttgctcctt gcccgaagaa aagtaatncc 540
atcatgggct tgaatgccaa ttgcgggcgg gcttgcataa cccctttgaa tnccggctta 600
nccttggccc attcgaacca cccaagccga aaacaatttg catttngagc cgaagcaccg 660
ttacttntgg atgggaagcc cggtcnttgg tccaancaag gaatgaatct tgggaccaaa 720
aaancaatna agggggcttt tgcggcccaa ccccnaaatt gtttcgncca nggcttcaaa 780
ggggccgcca ttgcccccaa cgggngaaag gaaatnttcg tcntggaanc ccaattgggg 840
gaaagnccnc nnnnctttnc caaaaattaa atggg 875

<210> 752
<211> 746
<212> DNA
<213> Homo sapiens

<400> 752
tctattngcn tntgcaaaca tgggatttca aaccngcttg gggggccttt cttggactgg 60
gttcaaaccc cnaaaaagcc aagggngggg gaatnaccan tnttnaccna agctgggttg 120
ggcattttcc caaatttctt gggaaagaac cccnaagaac caaaaatttc cgnggagaac 180
cttnattgaa cccananccc nttnggaaat aaccggggcc tttcgggggg cccttgaagc 240

ttgggaagaa gtttgatggg caaaggtctt caagtcaaag ggcacttcaa gcttcaaaaa 300
taccaccacc acctggtttg ccattattaa gaagcttggg aaattaaggc aaaatatggg 360
accagggaaa tcttgaaatt tcttgtgttt gggaaatttg atgaagggtc aaaaagtcaa 420
accaaaattt cttgaaagac gcttgtcagg aagggtaaga aaagaaaagg tatcaagcac 480
acttgatcaa gccagcctaa cttgaaagat gatgtattgg aaaggggaag ttgggagttt 540
gtttgaaaac ccaagggngt ccatgatccc tccccacttg gaccttttt taaanaaaaa 600
ttcttgnggc cccgccattg gtatttaaaa atcctcgcca ttcaagtcnt tccttgcaaa 660
aaaaaaaggg cccnnngggg ggccnattng ggggttgggg ggttaaccag gngtgggnnt 720
tnttttaaaa aagggggggg gggggg 746

<210> 753
<211> 349
<212> DNA
<213> Homo sapiens

<400> 753
gctacctgca agaagtcaga acttgagctc aagaaggaaa atcaactggg tggaccccgg 60
ggccttnccc cacacttnnn ccnaaagaaa attggccccc nccccctttgg gaaagcgcca 120
aaccnatggg ggcctttcat tcttttattg ccaccaagac attagggntt caactttccc 180
gcttggcctt naccnttaag aatcattaag aatgccctaa naatgggagg ggcgaatgga 240
ccattaaaag ctagctcttc cttttcctcg gtgggncttg gngggaaagt gaccttttg 300
aaagtaaacc cagcaaagta agcattcatc ccaaccaaaa gtggggatt 349

<210> 754
<211> 275
<212> DNA
<213> Homo sapiens

<400> 754
atctttcagc cttgtgtgtc atctgcaaat ctgaaccaag aaacaggcat tctctttaga 60
agaaaaatgt ataggaagcc tgctcagagg aagngaggtg ctccagatga cctctggaag 120
tccctgccag gcttatgttt tgaattttct gtaacatttt attatgtaaa acagacncat 180
tagctatgtt tactcaggca catggaagaa gattgagaca attacctaaa aattcactgt 240
gacttttcag taaatgttat taaagaaaaa gtggg 275

<210> 755
<211> 768
<212> DNA
<213> Homo sapiens

<400> 755
atggagtctc gctctgttgg cccagggctg ggaagtccag tgggcacgaa tctttgggct 60
tcggttgnaa cctttcaact ttccggggtt tcaaaggcga atttttcttg gctttaagcc 120
ctcccgaagt ggggccgggg aactacagaa agaacaaggc ttgaaatggg tttccaagtc 180
ttttcaagtc ctggctcctt gggccaaaca acttgggacc tcttcaaaaa gtctaagcca 240
aactccttct tccaagccgc ctttgataaa acaaaccccc tcatgcttgg gaaaccacaa 300
gcaagtgggg gcttgttttt ctccctcatg cacccccaagg gaaagcctct cctcttttgc 360

cttggggctt tctttcccaa gggccttaag cttgccaaac ccattttaca cccattgccg 420
aaagcccaag tcaagtcacc ttgaaagaaa aagggaagac tcacaagaaa gggcccaaag 480
atgaaaaaga ctctttaaat ccttgggggg ctttttgaag tttttggttt ttaagcaagg 540
gaaagacctt atttttaaaa aacaaaattg gttacacaag aaaattttgc caagtttacc 600
aggaacaaga tggaaatnaa aggacattta tnggncnnnn nnnnnnnnnn nnnnnnnnnn 660
nnnnnnnnnn nnnnnngnaa nggggggggg gggggggggg nttttttttt tgngggtttt 720
taaaaanggg ggggtttntt ttttttnaaa aagggggggg gggggggg 768

<210> 756
<211> 612
<212> DNA
<213> Homo sapiens

<400> 756
ttctttgact gccactttng cagggncctc aatcacttcc tttgggcctc ctggtatggg 60
gtggatgccc tccacttaag ttctggcccg atgtgctgta agcagaagta acgtgtagca 120
cttccaggaa atctctttat aagacagttg tcagatgcca gttttttcc ccttccactg 180
cattattact gccaggttca tagccattct gaggatttca gaaggctgat ctctggagaa 240
ctgaggggtt cgaaagattg acttctcagg agcagggctg agaatggaat gggcccttaa 300
tacctgacag tttcccaagc cctgatgaca caaagccagt gtaattaatt cagaacataa 360
ggcttctgat tccattactg actcatcatc agtaagtggc agcagcagca gaaagtcact 420
taagcttctt gtgatcatgg caccgtgatg ggcatcttgc atgctcctgn ctgctgacaa 480
tggcacatat ctgcagtgac gtgggccgct ttggaaagtg agtagcntgg ggttagggnc 540
tttaaaaaat gggggtggga tgcagntttg caaangctgn gggtagaagn acccctgggt 600
gaaacaactt tc 612

<210> 757
<211> 139
<212> DNA
<213> Homo sapiens

<400> 757
ccgaagcaca ctgagatgcg cngnctggac nagnctatcg tggatggaaa tgggagttgg 60
tggaanagag tcactctgnt gctgctggcc gtacaagatc gctttcccca aggaaataaa 120
ttacatttca ttctctatt 139

<210> 758
<211> 388
<212> DNA
<213> Homo sapiens

<400> 758
acactgaggc agtgggagag ctggaggagc ctgntacaaa cctcagccca ttagcatcnc 60
ccagctctgt ctttnganaa gatgactgan aggaaggtgg tnttgagaaa acaaagcatn 120
cancctttgt gaagcnganc cttaaggtcc cctctccagn cntggntgac cccanaccct 180
cnttttcttc tctggcntcc aacttnaagg attggcctgt ttccctttaa ctatagctac 240
cactcagctn actcgctgaa naaggcanag cccacgcctc ctggcacaag nttcccttnn 300

gctacctaag gcaagcgaat gagtcttttt catngtaatg aactgtattt cccttctttt 360
ggaaaaccng gggggtaaac aaataata 388

<210> 759
<211> 178
<212> DNA
<213> Homo sapiens

<400> 759
ttgcacaagt tggttattnc ncaggtggac cccnttnaaa agatggnttt taaaaggaat 60
ggaccaanaa ttattttgga ttggaaaaga atggggcccn aaccaaaggn ggnttacctt 120
ggnttacccc ttcttaaaat aaaaaggttt tcattcacct taggttttca cccattgg 178

<210> 760
<211> 586
<212> DNA
<213> Homo sapiens

<400> 760
cngaactnga ggaancagng ttcttagttn ggaatngggg gaaagttcnt tcaccaaccc 60
agggctttat ttcccccccc ccaaggaatc tttattgctt tctttaangg gccccgggct 120
tcactttccc ngggaggaac ttgaagaatg ggcttggaaa aaatggaaag aaacaggggg 180
aaaactttgg gaccccagaa gacattactt caggagggaa aagaaacgct tgttgttgaa 240
agggcgggag ggccaagaag ggtcaagggg gggattcatc tattgaagcc accaagactt 300
gccacaagac ttgccaagcc aaccctcacc aagaagccag ggaagaagag gcaccaaggg 360
gcaagaagtc tacctcatac ccctcaagaa agggaggtca aaccgggtgc ttgatacctt 420
ggatttcttg acctttacct ttcaagaaac ttgtggaaga caaataanat ttctattgtg 480
taaggccaaa aaaaaaaagg gggcccgggg gggggccant tcagnttggg ggacttaacc 540
agggttgaaa ctttgtttaa aangggggggg gggggggggc cccccc 586

<210> 761
<211> 572
<212> DNA
<213> Homo sapiens

<400> 761
tgagctcctg cagnagtaga actgaactcn tcatattcca ganctcaagc tnccaccatc 60
atgcagnaag ggctctancc cnctctacga tgctacngnc aacaggatct ncaggccacn 120
gctcnggccc aggtactcac atcagtggtt ctatcaacac tcaggacaga cccatagaag 180
aggcccaagc aggccctgga agtgcatgtg gaggccacca ggcaaggaat tctggagtcc 240
cagatcatat ctgggtgtcc atcagcatgt tacttcacat ctctgtacct cagtttattc 300
atctttcaaa tggaagcaac atatagagct gccttataga gttgctctgg gtattagatg 360
tataatatat gtgaactgct tggtactggg cctggtatat ggnatgtgct caataaatga 420
nagntggtta ttattgncat ttattatcat catcatcatc atcataatta aatattattc 480
caagccacaa tgtggttctn atagncaaca attatttaat aaatgnaacc ttttccaaac 540
ttccgatctg nnaaatttna aaaaatattt tc 572

<210> 762
<211> 544
<212> DNA
<213> Homo sapiens

<400> 762
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ttcttcttca cactcactca tgaaaagtct ccgattttcc caccttgctc agccacctta 120
agtgccttcc ttcaagatat ttcctactgc ttctaaagag gatctcccat tggcttggga 180
gcagcgtgag aagagacttg tacacagaga ggctgggcaa cttgtacatg gttgcacaga 240
tgtccagagg cagtgctgag atgtgaacac aggaagactg gattcagcat ctgtgctact 300
aaccaggaca ctatgaagtc tctcatacct gtggtactag gaaaatcaga gaaaatttca 360
aggagggtgg ggcattagaa gctgactatg gaggaacccg nangagattg attttttggn 420
aaannaaagg gccnggcctt tgcnggtaaa aaaangggag tgttttctgg atgccaacac 480
atttggggcg ggcctaanat cangaataga tgggctggat cttcagnatg gacttaaggt 540
tctg 544

<210> 763
<211> 658
<212> DNA
<213> Homo sapiens

<400> 763
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gaccctttca aggtgaccca tcattctttt tccagaaagt ggcagcttnc ttattttggg 120
ataagcgacg acagacgaga aaccacaaag aatctgcaga cgcgagactc cctgacctgc 180
agatatacag ccatctccaa taagtctaca tttaaactaa aacttctcct gttgagcaag 240
cataatgtgg aattatgtta gcaagacctt atgcactccc acaaattttc tcccaataaa 300
aaaaactgtt atcaaaggat tgtcaccccc ccagacatac agcactgcag ggaaaaagga 360
gcccagacag ccgttgggag ttgacctctg gccgcacgcc tggggtcagt ggagatctat 420
gttgacttta tctgtgtgcc ctttaaggag gcctcttgct taaaataact aangngccnc 480
taaattacac ttacttgnaa tgctggatta atggattctt ntacaaangn tgaaanacct 540
gggcttttgg ccttcatgan cctaanttta actaccatga agcttctgaa tctctaccca 600
tttggggtna ctnccttttg gggnaaaana agaggtntat caataagcct ttttgagc 658

<210> 764
<211> 658
<212> DNA
<213> Homo sapiens

<400> 764
ggctcctgca tcggtanact gagtagtgtc tagnagncan aaagacagtc tcctgctggc 60
tttgatggaa agagcaacca ggaatgagtt ctacagctgc aaggaagtga attctgccaa 120
caaccaccag agcatggaag agaaccctga ggcttatatg aaactgcagc ccctgtcaaa 180
actgattaca gacttagaag accctgagaa gagaactaag ttctttctgc attcctgacc 240
cacaaaactc caaggcccga tagctctggg aaagcagaac ttggcctttt ccaaaaattt 300
tctgcccttg gttttgggga tcatttgggc aagcccgagg tgctgtgcat gggggctcct 360

ggaatcctga gaagggcaga aagccttggc cccagactca tcgtgcagca gctctgagca 420
gtatttcggc tgaggagtga cttcaagtga atattcagct gaggagtcct tggccacgtg 480
tcacaaccct acttnttggg ggcctggggg naaaaggcgg cntaaaaagg ttccaagggc 540
ccaacttgga aatggnctgn attgcttggg tcacaccagg cggtaattta nccttctttt 600
gagctggtaa ncgcctgnct ctgaggctgg gngagaaaaa tatcacaagg gcccaaag 658

<210> 765
<211> 507
<212> DNA
<213> Homo sapiens

<400> 765
gttggctttg tagaagaaat gatgtcctgg aaaattgctt tgaattgtac catctcagaa 60
gtggggaaaa aaaaaaggtt cttcatttaa naggtagccg ngagcacaca tttaacccat 120
acccggaaca acatgaagct ctgggagtca naatgccttc ggctgatatt atttatggaa 180
gcccaccana tgtttttntc aatcccanaa gccagggctg ctgaaatacc tnttcacata 240
anaatgcacc tacatcagga gcacagccaa aacctcagtg aaacatgcct ttcactgatt 300
gctttctgcg ggggtaaact cccgcaaagg acaaacccag gacagtgagc gggtgtgtnt 360
gnttgtttnt aaaaaaaccg ggggctcccg ggatttnggt tctntncctt ggaagngcnn 420
cccctgcctt ntttttaaaa agnggttaaa tgatgttaaa gacttgcctt tgactgnggg 480
ttgaaccagg tgtccatgcc atttctc 507

<210> 766
<211> 186
<212> DNA
<213> Homo sapiens

<400> 766
gtgaagaaat gagccataga gaaggacttg cccaagatca cacagcaggc agagccggga 60
catgaaacta agcattctgg ctccagagtc cacgttttta actcaacgga atactcagca 120
atggctgagt ctacgccctg tcgtcccctc ctgggtctca cagaatggaa ataaatgtct 180
caactc 186

<210> 767
<211> 225
<212> DNA
<213> Homo sapiens

<400> 767
atgaggccca gagaagctga ctgactcaac cagtgtcaca ctatagtcgt aaaaccagaa 60
ctatcttatg tagtcactaa tttatgaaca gcttgggtat ctgaagttta agccagctgt 120
ttaaaacaga acgaaatgtt ctatggtatt aacatataag tgttaattaa ttaaattacc 180
agactacata cacaccaaaa aaaannnggg cngggggggc caatt 225

<210> 768
<211> 290
<212> DNA

<213> Homo sapiens

<400> 768
gcaacaacgg tcacatcctt tcccttctgt gtctcagcca cagtgtgggt gtgaacaaga 60
aacccaagca gcatcctcat cctatctgca gctacgatga ggactccaac acttcctcaa 120
ccacatgacc actcggattc aggtgctaaa gaagcacttg tttaaaatag ctaaattgtg 180
gctcctgaat tagctatgcc aactattttc agttacaagt cttcacaata ttttattaaa 240
gtattaagtc aatgattaac actgagaata aaaaaatatt tgccctttct 290

<210> 769
<211> 524
<212> DNA
<213> Homo sapiens

<400> 769
gtcagacctg gagaagtgcg gagacaatgg tggggaaagc cccttacaaa accatcagat 60
ctcgtgagaa ctcatccaca tcacaagaac agcatgaaga aacggaacaa ggggaatgca 120
atctcacagg atggaaataa cctgtggtga attgttgcca tccagatcca cttttaagtc 180
cacatggttc attcattttg gactagatcc tggtacagcc cagtgaactg atattcttga 240
aatcaggcac agaggctctg aagtaatgca ttacatttgc atccatgatt tgcttaaaat 300
gttccattta gcctttcctc ccaggaaaca aagccagcag tatttgatta ttgaatagct 360
cgttttggat gcttaanttt ggaaaaaatt tttttaaaat ttngggaaac ttggnntttt 420
acaaaatgaa tcatgagttn tttttcaagt tttganttgg ctccaagggt tgaaataact 480
tanaagtcta ggatcattat atattagctc tattttacat gctc 524

<210> 770
<211> 173
<212> DNA
<213> Homo sapiens

<400> 770
ggccagacct ctgcagaagt ggtgtcaatc acttnactcn tttcnttagc ctactggncc 60
ccccnnttan nancccnaaa aactttncca aaggaaatca aactacagaa cagcaacaaa 120
ctcaaaaaat taacatttgg cttttgtgtt attaaaatat tttctcagca gac 173

<210> 771
<211> 548
<212> DNA
<213> Homo sapiens

<400> 771
gctccttcat ccccaaacag gaactgctgc aaggcccgca gcagccatgg gtgagtggct 60
ctggagatgg ggtaagtggc ctacgcaccc cagaggaaca gctggcagcc tagtcttcgg 120
gcagcagctc cactcagccc tggggaatga cagatacaga caaccagtta tgccagtgaa 180
gtgccctaaa ctagagatag ctggggcgct gtcagccacc ttaacagtga gaagaagcaa 240
caggatgaag tggaaacagc gtcacacaga tggagcctcg aatcccagca tgctagccat 300
gtgtcatctt catagtcttc ctaacgtctg tggcctcaga tgccacatca gtaaatggca 360

caccatatgt gatttaggct aagggcctga gtgtaataag ttgcttaaga attatagccc 420
ttcttaaata aatggagaaa cagtccatgt ttnnnnnnnn nnnnnnnnnn nnnnnnnnnn 480
nnnnnngggg gggggggggg ccttttntt tgggtntaaa ccgggttnnt tttttaaaaa 540
gggggggg 548

<210> 772
<211> 532
<212> DNA
<213> Homo sapiens

<400> 772
cagcgcctgg cagtctgcat catttcgcca cagtgtgaaa ccattggctg atgtataaag 60
tggaagcccc aggaacctct caaggcccag cttcagcctc accttccctg tggtcttctt 120
caagcagacc cataccaagc tctctgtgct ttggaaactg ccagtgaggt gaagtgggga 180
ggcatcggag cgacagccac gttgtatgcc tgctgcacga gccagaccgc aggacaatac 240
tcaatgagag gcaccaacat ccatcctggc tgagctgatg atggtgagag gccacagagc 300
catgaaaatg acttggagca gcctccatgt attcctcagg gttgaatcat tgtgtgcacc 360
acanancaat tttntttttt taaaaaaaag ntaaacactt gngaaaaaaa gggggtaggg 420
cccnttcctt gttttgacca aggaacaaat gcaaaccaga ccctgcttct ntcaccangc 480
anaagcttgc tctttcaatt cagagatatc ttcaaggacc caattatgct cg 532

<210> 773
<211> 8
<212> DNA
<213> Homo sapiens

<400> 773
gcaagaag 8

<210> 774
<211> 180
<212> DNA
<213> Homo sapiens

<400> 774
ccccctgcnc atgaagaagc ccatctgtgg taggagagag tgatgccnac ncaccagaga 60
aaagaaacga gagagaaagc agagagacag agacagagag agcgagcatt ctgaaggcca 120
gctccccttc ccctgtgctt cccaggtcct gtgcttgcca ataaactgcc ctttttcttc 180

<210> 775
<211> 121
<212> DNA
<213> Homo sapiens

<400> 775
aatatgttga atcctaatta ccaactcgat agtattagga gatgggacct ttgagaagtg 60
attaggttat aaggatggag ccctcatgga ccggattaat ggaaagagaa gaaaagaaaa 120

<210> 776
<211> 462
<212> DNA
<213> Homo sapiens

<400> 776
ggctgggcga cacctctgct ccactgacaa cagcctatcc caggcccatg gtgcacccct 60
ccagcatgca ggagaaggga atgcctcctg actgaccaag gaagccacct gcaatctctc 120
tccagacctc ccgcctttct ggtccctggg ctccctgtga cctgtttccc aagtcctccc 180
ctccagggct taagagggaa gaagaagtga cataggacag tcctccccac ggcagcctga 240
aaggaccttt gtgcagaggc cagcatccag agcaggacaa cctcagtgag gcttcctccc 300
aactccccct ttaccacaaa agcccttnag caagctnggn cntttaaaat aacanaancc 360
ccaanntgga aggggccctt gaagtcatta tggaacatcc tcagatcaan aaatgaggca 420
aaggtatttg gggaaataaa agctcaagag gggcggaaag ta 462

<210> 777
<211> 341
<212> DNA
<213> Homo sapiens

<400> 777
catctgcatt aagcgcantg aggctacatg tacacagttg tgcagctgaa gagaccaacc 60
agagctggaa tccagcctac attccagtca ccacgcatgt atccggacat aaagggagta 120
ctttttccta atcattaaga ctcaatatga gctagtggga gatatgactg aagtcatgac 180
ccaatctaaa ttaacatcat tatataatca actgcattaa ctaaaaatgg caagtataca 240
gcctcaaatc aataaaggat gtatgcaaaa aaaaaaaggn nnnnggggnc nnttnagntn 300
ggnnttancc aggnngaact tgttnaaaag gggggggggg g 341

<210> 778
<211> 523
<212> DNA
<213> Homo sapiens

<400> 778
gaactgagga aagagaagcc agctctataa tttcacaaag tctccccacc ttactcatct 60
cgagtagtga ccaccgtgaa tggtcccacc gccagcctct tgggaggcag ccggggaaag 120
cactccatcc tgggacttag gagcatgaac tctggagaaa cacagacctg tgttcaaatc 180
cgagtccact gcgtcctcac aatgtgatct tggacacaga tccaatgtgc acagcaaggc 240
attcaaatag cacaaaggct agatcctcca aaggaatttc gccttcagct ctgactccca 300
gttccccagt ttacctgtct ggagccacca tttagaagct tatgtatata aagaattgct 360
gacacagaga cacgaagtga gcatttgctn gttggggaaa aaaggggccn taatntnttt 420
naccaggaat tgccacaanc cttnaatttt gtaaaacaag gcccaacaaa acaaggtatg 480
cggaagcagt ccaggcagta caatcagcca aaactgatta tga 523

<210> 779

<211> 507
<212> DNA
<213> Homo sapiens

<400> 779
agaactgagc acctctgctg attgtggtgg cttacccaag gcatatccag atcctcattc 60
ccaaggaatc tcagtccctg gtcccctgct gctgcattta accacttatc atcaataaca 120
aacaagggag tatgaagaat gaattccttg cgtgacaaac atttttctcc ctgcccattg 180
tgcaacagaa gtgacacttc ctccagatat tcagggttaa ttacctctgc tagaattgtg 240
acttgaatta ctgttttaag ccaactcatt ctttaatcaa gttcagactt ttgcctcatt 300
cattcgctga ttgttacaga ggtgtaagtt cagaggttgc catctagcct tcctcactac 360
aatagcttta atccacaggc cnaggaaccn cgtgngaaaa aatnggctgg gttcccaaag 420
ngggnttttt ccaactatca ttcaggcnct ggaaaaaagg acttctgact gagtctggga 480
acccgatggc ncattgcaat ttaaaag 507

<210> 780
<211> 478
<212> DNA
<213> Homo sapiens

<400> 780
cagccggaat gatgctctga agaccttgtt ggacagtgca ctcttcactc aaacctgcag 60
cagatggaat gatgctctga agaccttgtt ggacagtgca ctcttcactc aaacctgcag 120
cagctggaac gatgctctga agaccgtgtt ggaccatgca ctcttcactc aaacctgcag 180
ggctcccgca tctcttctgg agcagaagcc cacctgccag ctcatcccga ctgtgctgct 240
gcctcctctt ccccactggc tcagccatcc atcaggcctt gtgcatgcag ctggccagct 300
ccctctccag ggaacacttt tcccctgcat ctacttggcc aacttcctga tctcttttaa 360
ctcattcacc ttctcaangg gacagantaa cgctttgggg actnaagncc aacantctng 420
acccatctcc aangtttcta tccctngttg gctcctacag gacataccct atttgctt 478

<210> 781
<211> 491
<212> DNA
<213> Homo sapiens

<400> 781
gaggatgcag cactggcccc acagcgccca catcctggct ctggaaacac tcggtctcct 60
gattcagtga ggctacacgg aagcatgagg cccagctttg ggacaactat gacatctgca 120
aggctgcaaa gaggttttag ggcgagctcc aggctggtct ctgcggccaa ctgactgtgc 180
gtcacggttc aggagtccct gcagtagcca cagccgtgct cctgtaaaac gtttgtgggt 240
cctatgttta cattctctga ctctgaaacc atcgatgtca ccaaacacac tcctgttggc 300
ctgtgtttaa cacaatccaa ttcagacaca tgaanatgat nangtgtggg gtgccaagct 360
gaaagtgcta ctttcagttt ggtaaaagna aaatnntaaa agnactaact ttaacatccc 420
aaaaaattat tnttatacca aaaacatttt tagagattga agaacagtat aaaacctttt 480
cctgttcact g 491

<210> 782

<211> 193
<212> DNA
<213> Homo sapiens

<400> 782
cctcaggtgg tcgctggagg atgaagatgt gtctgaggct gactgagatg agctaatggc 60
ctgctgccca ccagatacaa gaatgagctc cagccaagac cagaagaaca tcccccctgc 120
ccaagcgcag ccaaggtcaa cagaactgac cacatgaccc atggactcgt gagaaataaa 180
ttatggttgc tgt 193

<210> 783
<211> 537
<212> DNA
<213> Homo sapiens

<400> 783
acgcctgact gaggctgtac aagatgngng gtgccagcat ctgcttctgg ggacagcctc 60
aggaatcttt caatcatgga agaagtgctc cccctggaaa tcagagaact gtgtgtatag 120
aagatggaag atgagagaga tatggaagtg ttattatgat ggaagtagaa atgtctgaga 180
aagtgaagat ctagaggctc aaaagttgcc tggagactct agactggaga agaaatggaa 240
gtatagagag gttgaccagc tcaaatcact ctctcaggaa gcttcagagc tgagatccaa 300
gctccagggt acttggcttc aaggccagag ccactggtct agagtgccat agattagagc 360
taggtattta tgggaaatgn ggnattctnt aaaatggtca ccagggganaa ancttttggn 420
gggaaaaaaa tttgacctcc ctnatcctct ccacaatctc tttaacatct catatctggc 480
atggccacac agttcaaggc attcaaacga ttgccttcat gggtttcttg ctgatgg 537

<210> 784
<211> 241
<212> DNA
<213> Homo sapiens

<400> 784
ctgttatcct cctatttgta aaacggaggc acctgggacc cagctccagc aaggagagtg 60
aggatccgac tccaggaggc acctcaggac caaaggcctc aaggccaaca ccttccacgg 120
cacaagcccc acagggctgc aggacccgta caagcagcgg accatccctt tctcttcttg 180
actatgtttt cccctgatgc tttgctttcc acatagaaga gttttccatt ttcgtggggt 240
c 241

<210> 785
<211> 308
<212> DNA
<213> Homo sapiens

<400> 785
aactgaggag ggaaatttgg acatggacac atagggaaga cagccatgtg gagacagagg 60
cagaggtgga cctgctgccg caaaaccaca gggcgccaag tactgtgggc cactgagaaa 120
actaaaggag aggaaggatt cttccctgga gctttggaga gggtgcggcc ctactttcac 180

ctggatttca gacttcagac ttccagaacc atgaaggaat aagctctctt tgtttcaaaa 240
ccactcagtc aaggcacttt gttacaacag cctaggaaac taatacagga attggtatta 300
gtaaaatc 308

<210> 786
<211> 377
<212> DNA
<213> Homo sapiens

<400> 786
aactgagcat ctgcctcctg tgtcccctct ttccctgttg tacggctaac accagatccc 60
agtctcttca gtggcactca actttttcaa gtcacaagat ggaagcgctt tggaagagga 120
gtaaaggacc tggactctga ttccatgcca ccgcaaactc gggcaggcac ttcaaagcag 180
agagtctcat tttccacttc tgaaaaacac atggtctaga tgagctctaa gtcctttgca 240
ctcaataatt tcacagtctt ttttattatt aatattattt tcaattgaaa aatcataatt 300
gtatatttat ggggtacaat gtgatgtttt gatatatgta ttcaataagg aattattaaa 360
tcaagataat taacatt 377

<210> 787
<211> 208
<212> DNA
<213> Homo sapiens

<400> 787
gtaagcagac ctctcctgtg atgttctgga tatgcctgtc tcaacagatt tcagggtggc 60
cgtcttctct gcaaattcag ttctctgatg tgtccaagcc ttttcctgcc tataaatcca 120
gcctcttctc aactcaacag aacattcaat tttatagaat gaggtgttgc ctcattctag 180
aaccacaata aaagccaatt tgatcttt 208

<210> 788
<211> 523
<212> DNA
<213> Homo sapiens

<400> 788
agtagactga ggcccaaaat gcatggcaca gggaagggtt tgacaacttt ttgatggatg 60
aacaaagaag attcaagcca cttgtcaaca agctcaaagt gattgaaagt ggaagcattt 120
acccacacgc tcatgcagaa aatgacagga aatcatccag agacacttgt gacagagatg 180
agaactgtca ctgttgagag gtgctgcgga gatgggtgtc cacggatgac cgttcggagg 240
ccgacttcgg ggatgtggcc ccattagctc aagagtgggt gactccctac cacactgatg 300
gcgttggcca ggacaggaca agcctactgc agtgacacag tgtcactgat ccctgatgcc 360
cacgtgggng gtttactttn actaaagccg ggnanaaana ttgcaacaag anaattgagg 420
ccccagcgnt gagcagccca atcacctggt tgtaagcagc gaagtgtttt ttggctntgc 480
tcntgggccc caaaccactg tgggctcacg aaagaatctt tca 523

<210> 789
<211> 501

<212> DNA
<213> Homo sapiens

<400> 789
aatttatttg actccaagtc cttgatcagg aagacaactc ctaaagataa caatcttcct 60
aaaggaaaat gggactgttt tacaaggagc cacagaatgg tggatctgag aatccaacat 120
agggaaaccc actgcttcat ctaccattat gcgcttgtat atgcatgact tcagggataa 180
atgggagcca gaagtacaaa ggaatcttca gtagtagaca aaacgcagaa cccttcacgg 240
tttgaccagg gtcattgtgt gtctgcctgg tcatttgacc agctcttacg aatcaggaac 300
ccagctgaac ctcagttgaa ccagcccctc caacagaact gaggggattt ggggctgata 360
agctcantgc tatgtttaca cgnncgcctt tttntaaaag ttgcagtttt tgnaaatgga 420
anctatattt gggtngcata tgatttctat aatgnattac tgncccaccc ctgcacatcc 480
ttcagagaac agtaaccagc c 501

<210> 790
<211> 506
<212> DNA
<213> Homo sapiens

<400> 790
atatttcctc caggagtaat ggatgcctga tcatctgaga ttacatctgc ttcacgcata 60
caaactgcat aaggcaatga tgttgcagag gctccacatc atcactcacg ttcagaacag 120
acaggagcag cagcaggaaa ggaggctgga aattaaatcg tgaacttttg gattgtgatt 180
ttaaaaatat atctgaaatt atcatgtaca tgaataataa cttgtaatag aaatagaaaa 240
gataaactcc taagataatg taaaaagcta aatattttaa atattcatct tttttatggt 300
tgagtgaatg tttgatatct catgttatct tgattatctc tgacctctaa atacctggat 360
ctccaccccc tctatnttct tanatcccct ttcccnaaag ggaaaagcct gggctttaat 420
tggaggaaaa taancctaaa agcctggccg ataggggaaa tttttttct agttttaatt 480
tgaatattta tcatcaaact gaactt 506

<210> 791
<211> 421
<212> DNA
<213> Homo sapiens

<400> 791
acgggtctga agaagcaagg actggcaagt ctgatccccc actctgattc tcattgctga 60
atgtctgggt cttccttgtg tacctgctgg ggtgggagac tgctcgcagc atacctggcc 120
tatgacatgc ctagctctct ggggtggatc ttggacagga agactgcttc tgccagagta 180
aagaatatga cggagctcct catccgatgg agcctctggg aagaggcgaa gagccagctg 240
gaagcctggt gggcctccgc tgccagcagg acagatgcat caagtcaggt ttatgggaga 300
agtcttccca gaccactatg tccaaacttc tgtccatnct gctataaccn ntttcnncgt 360
tnagtnnggn ngaaaaccan accanttcan ccttggccaa aagctgcaaa gataagaacc 420
c 421

<210> 792
<211> 361

<212> DNA
<213> Homo sapiens

<400> 792
agaactgaga aaccatgaag ttatttggat gatagataca gagatacgct gctcagatgc 60
ccctttcaag aaagaacttg ctgcctcttg ctcaagtttc ttcctggagc tttcaagcat 120
ctttgcaggg aagtcacatc cttcccaggg cagcccgact gaccaagaca ccgatacctg 180
aagctatgat aaccttcttg tgaccaggag acaacaagca gaaggccaaa aatacccaag 240
aatggcagag cagaaggatg gaaggagctg ggcttcatta taacattgga gagtagccag 300
accaacaact ccagcaacca aataactctg ttttcttttt aaanggggta ttaaatgacc 360
g 361

<210> 793
<211> 316
<212> DNA
<213> Homo sapiens

<400> 793
tctggtacaa tgcctgtcgt cacataagtc tggcttcttt atgtgcttga ggaaaaagga 60
ttgaaaacga agatcagaac ccagcgcacg acaatgggat catttttca gacacagcct 120
cctgcttcat ggagctctgc ccttcctgcc ggagcaccga cctccgaagc cagcacaaca 180
gaccctccag gctgccccca gttccttccc ctgccctttt gaacttaaca ttgcctgtta 240
gtgctgcctc tggatggtct gttaacctta ccatgctttg agtcaaactg gactgaagta 300
gacttctggt caaaac 316

<210> 794
<211> 556
<212> DNA
<213> Homo sapiens

<400> 794
ggcnggtcna nccttnnggt tttngcntaa nnccngnccn ncnngttnga aanngggggnc 60
ctcnagaaac naaaaccatn gtancccntt gatcccctna cgggnggtcc caaaaaacaa 120
ggaagcttcg aggccatgag caaaatatac caagcccaag tggaacccaa gcttgtcttn 180
ccccatctga cccggtggtg cttttgggcc attgggcatg ttcttcaccc gcctggggtt 240
cttcgtttac cgaangtcac ctctaccaaa gtacactcgn ggataatcta taaaagaact 300
cctcatcttc cttaagtggg ccctcactct tcatggggct tttgggaagg ccctcnttcc 360
ttgcttggct cttggggttg gnaatctaac cgtgnggagc acccccaang ggngaaaaaa 420
accacaaaan ggggntttct ttgnaaaacc cnggcttttt tggnaaaaan aactttttttt 480
tttaactggg ggggnnggga aagnggnccc accctggctt gggtcaataa ataaaatggc 540
cggaatgtca taagcc 556

<210> 795
<211> 511
<212> DNA
<213> Homo sapiens

<400> 795
attaaaaaaa gaaaatgtga atatgaaagc agagagtgag agtgaagaag gcacaaacag 60
aaggacattg ggaacaagca gccgctaatc atcatcataa cngactcagg ctggatctga 120
gaaaaggaaa aaaagtggat aaagagtgtg cacttctgtt ggggcaatga ctccggggcg 180
gaagaggctg aaagaaagga ccaatgcagg gaggaaaaga aattgcccaa ctccttccag 240
ggaatgtaga tgaaaacata tagacacaat tgggagaaaa tttggggcag ctgatctgac 300
tatgaactgt tttgataaga tgaatgacca gaactcccaa tactncttga gnagaaaatn 360
ttcccctgcc cctacaanaa naggctgnga anacactgtt tgaactcaga ccatcacaaa 420
agaacagtat gattattgac tttcaatgag tttcttacaa ttttatacct aattactatg 480
ctggcaataa tgattatgta gaccattaaa t 511

<210> 796
<211> 511
<212> DNA
<213> Homo sapiens

<400> 796
actgaggtaa gaagtctgta attttgactg agaatgaaaa ccctgctgac atgatgattt 60
gtggcagata atgcaactga ttccatagag atcgcttgag atcacaagtg atgtgaacaa 120
tcaatctgaa aaataaaatt tattcaggcc atcacttcaa gagaacacta tgaataggtg 180
ctggatctaa tgacctttca atggaatggc cacttaattc aatccaggaa atgtttgaga 240
gtcaagtaga tcaagggaga catttaatga catggggaca agcatggtac cccagggata 300
ttccaggaat tgagacccta ttgtaccttc aaacctgaga ttgnatgaat tctccactat 360
ttggggggct tgggttncct ttntctcccc tncaaaaaag gnctaaancc atcttgcata 420
gctttaaaat gaaaanctct attagcaaag tttgtaaatt aactcttaaa ggctcttttc 480
aaggtagatt aaaaataagc tggaacccct g 511

<210> 797
<211> 525
<212> DNA
<213> Homo sapiens

<400> 797
agaactgagg cttccagggc tgtggggcca aatgtgccct ctcctgccct catggcaagc 60
ctcagttcct gagttctcat catttcttcc ttgctacaat cagaactgag tctagcaccc 120
ttcaggacaa atccagatcc ccaggagaga cagcctgatg agttcagctt ggaaagggtc 180
tgttcctgtc ctatcagctg tggccagcgt gccagggtca cgtaccagtg cgactgccac 240
agcacggccc atctgtccag gagtagttct cagtcaacgg gctccagctg ggactcaggc 300
tgaatagatg cccacaagga tgtctgctac cacatgtaaa gtgccccaaa gcaggacaag 360
ggctcaacna gggngggccc cgtttaatna agggaattct gngtctgtct ganaanaaag 420
tgggcgatga gcaataacaa ggcctgtcgt ccatctggaa gaactccagc caccccccaa 480
actttcaggt gcatagaacc acctggacat aagacacaaa cattt 525

<210> 798
<211> 321
<212> DNA
<213> Homo sapiens

<400> 798
acaaataatc tctacagtgg acctcaagac ttcatactaa gattctgaag atgattgagt 60
caatggatga gtgtaacgaa cttttggaaa cttcaaggca attaaaggaa actgcaggag 120
gaccagaaaa gatcaagacc agggcacgag ggctgatcca aacaacgggg gccggcattt 180
gtgatcttgg gtagagccac cccagtgtgg gtcaactcca cagcattagg aaaaccagtt 240
tatcagaatt accttctcaa gcaatagatc tgttccttgt cacattctta gaactaataa 300
agacttatct ttattactac t 321

<210> 799
<211> 354
<212> DNA
<213> Homo sapiens

<400> 799
actcctgcat taggtncaac tgagtttgga gatcttcccc aatatgccca gtggattctc 60
ccaccagggc caggtaacct tcctcaccag aggtgagcat cttgggaaaa agtacatcct 120
gtctttgccc ccagaggtga cttcaaagag gcaggtatgg tcaagagaga cactggaaga 180
tggaagttac ttcagtgttc cagttgctgg tgtagccagg gcttcacagc gtggaagtat 240
ggcatcatga tgtctactgc acatctattc ccaaccccat attcagttgt ttcatgtagt 300
ctcttgaaat ctatggaaac tagaaaacac tacaaataaa gccttgattt attg 354

<210> 800
<211> 409
<212> DNA
<213> Homo sapiens

<400> 800
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gttactggtt ccaagaatgc tcttccttgg atctcagcgc cttcctcagg accctctctg 180
cgttcctcac atgctccagt gccacgtgaa caatgaagct tccctgagct ggactgcaat 240
ccagcaagtg gctattcttt caacagtgga gactgggctt cgctgccagg gaaagtccca 300
ttttaaggga gaatttgcag tgggccggga ctgcgatatc ttgtgaccac agaaagatca 360
aacagggcac cttgagtatg tgagtctatg agttttacca ttgaaaaca 409

<210> 801
<211> 399
<212> DNA
<213> Homo sapiens

<400> 801
ggctcctgct tagtcnaact gagatgcaga aaccccggccc agggaagacg cagcttgagc 60
aaggtcaccg gcagtttcct ttgcagtaaa atgggaataa aaagaaaatc tacataacag 120
tagatattct gtgaggatta cgtgaattca tatttgaaga gtgagtagaa gggttcctgg 180
cacaagctct acaagtgtgg ctggaatgaa tatgatgatg aggatgaaga tgaggatggc 240
ggggctggag ctcaagtgcc atactgtgtc ctggagcaga agccacgtgt tgaggacagt 300
ctggaccctt aacgagggtt gagccaccga caccagcctg tgactgttta cctcttgagt 360

ttgtttacag gagaanaaaa taaactctct ccctttgtt 399

<210> 802
<211> 292
<212> DNA
<213> Homo sapiens

<400> 802
actcctgatt agtnnaactg aggaataact ttcttctatc ttcaccttcc cttttggcta 60
cagccttaag aagaagtggc agaaaaacat ctgagatgaa gagagaccct aggttcctga 120
catgtccagc ctctgagtca tagaggtcat ataaaaaagt aagagagaga aaattgtgag 180
agataggctg ccctaagagt ggaaggcatt gaatgttaca cacagtttgg agtcatttgc 240
agacaatggg tattaacctt tagttttggt catgaataaa tagcttattg gg 292

<210> 803
<211> 486
<212> DNA
<213> Homo sapiens

<400> 803
gtttgctgca tatggttggc acactgtgca ctggacaatg gaatgtggct gaccaggcat 60
tgggagagat ggaaatccaa ccccctgaat gctcacaacc gtgcaatcta ccattcccct 120
catgaacgga tgcccttgtc ctacttactg catggactag ctgcagttct gtgaacataa 180
ataagaattt agcactcatg gacattgcct caatggatca acacaacagc ctaataagct 240
gagtcttatt tcccagatga agaaattgaa gattataggt gttaagtgac ttgctacaat 300
ttggaagcta gtgagtccag gtgctacagg gtaaggaaag cgctgcctat gcgggatgcc 360
cnacctnnng gnaaannctt tgggnaaaaa aatganccta taaagtccta ggaccaaggc 420
ctcctttttg ctgtcttctc gtctctcttg gaccttcagg cgccccgctt gggtttgttc 480
caagtg 486

<210> 804
<211> 440
<212> DNA
<213> Homo sapiens

<400> 804
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ggcacttggt catgtgccca gcaacattca ctccagaaag ggaatctgct tcctgtgcaa 120
tagaactctg tctggaacaa ccagggagat gttttcatcc acatggacag anatttccgg 180
cacctactgg ttttcccacc cacactgagt gttgccctct aaatgagtca ctctggtttc 240
cacagagagg tcaggtgtct ctcgggagct ggacttcctg aattcactcc accacgtttt 300
atctgtgtaa ccttgtgcag ggtacctaaa atctctgtta cctcatctgc aaaatgggga 360
tacctaatac ttngagaggt ngtggtgaaa ttaaacgcaa gggcacttgg ccaggagcgg 420
ggcacacgat aaatccattg 440

<210> 805
<211> 513

<212> DNA
<213> Homo sapiens

<400> 805
gagtgtgata tggcttggat ctgtgtcccc accgaatctc atgtcggagg tggggcctgg 60
tggaggtgac tggaccagtg tgctttcctg ttcttcagat tctacaaaga gaaacactct 120
gtttcccaga cttgcttaca gcaagggact tagatcccgc cagccagagg cactcccgtg 180
agatgggcag ctgtgcagga ggcatctgtc ctgccgtgca atgctcaggc acaaccagtt 240
ttggagccaa cagtcctgac attgactttc tatccctcag acgccagcca aggcagtgcg 300
ttcctggaat caacgctctc aatagcagct tcccaatcct tggccaaagt gatgtcactc 360
aaagccagcg ggtatgacaa aagggnttnt cnaccctnan atnggggnaa agttcacagt 420
accctggggn ggctgattnt gcagggtgtt ttttatgcat ttctgaaggc caattaatag 480
cccatttctc cagctcttcc aattattttt tta 513

<210> 806
<211> 161
<212> DNA
<213> Homo sapiens

<400> 806
ctgagagcca agaacatcag aggtgggatg atgatgcttg tggctatgag acaggatttc 60
aaggatcctg atgaaacgtc tgctggcctg tatctgtctg aatgctggaa agggctttgt 120
gttactcgaa ctgaaaggaa aacataaaat gatgataatg c 161

<210> 807
<211> 488
<212> DNA
<213> Homo sapiens

<400> 807
gaactgaaat ggaggaaaga tctctcttca caagacttaa cattacatgg ctgggtgtgg 60
tggctgaaac ctgtaatccc tgcacactgg gaagccaagg ggaggactgc tttagcccag 120
gagtttgaga ccagcctgga caacacgttt aggagattat ttgaacaaga accgaaattg 180
ctccttttaa atcagaaagc ttgacaatat gatggcaata taaacttacc agcaaccata 240
cagacaccaa gaagagccca tcgcaacccc tggggtgcgc ctggaccatc cttcctctcc 300
gaagccccgt ccagtattct tcagctccca agttcaagtg actgncgagc ctcacagact 360
ttnaaaaaaa cttggttcct ntgtgggggc cncnctnctt tgacctcaca ttntcaagcc 420
gagtgttcat tgttgcggtt cttgtaatgt ttctgcagtt ctaataaaaa caggagccaa 480
aaaaaaaa 488

<210> 808
<211> 362
<212> DNA
<213> Homo sapiens

<400> 808
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atgaatcagt acctggagac caacagcttt ccctctgcgt tccccattat gattcaggag 120
agcatgagat ttgaaaaggt atttgaaaga gcagtagatc ctggagctgt agtagacctt 180
ttggaaaacg gagaccctag caaggcagag acagaagcgg ctggacatcg agaggagtac 240
attggcactg gcagaacgac acggagtttg gccggggcag ttggaagaga gccggggctg 300
ccgagtggcc caactccagg ggaaaaccat ctccctgctg gctcccccat ctgctgatag 360
ct 362

<210> 809
<211> 336
<212> DNA
<213> Homo sapiens

<400> 809
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atgggaatga aagaatccga cttctactct cacacagcca ccgtgaaagt cctggagtaa 120
aatgtgctgt gtacagaaga gagagaagga agcaggctgg catgttcact gggctggtgt 180
tacgacagag aacctgacag tcactggcca gttatcactt cagattacaa atcacacaga 240
gcatctgcct gttttcaatc acaagagaac aaaaccaaaa tctataaaga tattctgaaa 300
atatgacaga atttgacaaa taaaagcata aacgtc 336

<210> 810
<211> 527
<212> DNA
<213> Homo sapiens

<400> 810
agaactgaga ctctttccat gatgagacta ttcacatcat ggcagctgag gactgagatc 60
tctttctatt gtggatgaag gaagatactg tgtgtcatca gaccaacttc aggcttccat 120
tgagtcattg tgcctttaca ccaccaccag ggaggaaaat tacttacttt ctaccaagga 180
agcagttaaa tcgcaaagct caataccatg tgatgtgaag actcatttta gatcagccca 240
agaaaaacac cattaagcag agaccgagcc tgtggttgaa agatatggag tcacatggca 300
gcggccacac ctcctcgaaa gctaaatcca tgactgggcc ttggtccccg caggctcctg 360
cctggcctgc cccttnctgt gctgggaaaa tgggaaaggg acnttggggc aaaatnggag 420
gancccctgcc tttgacaagg cacatacaan gggaaagtct gtcaaaaagc attngtttta 480
ctttcttttt taaaagaaaa aaaaatactg ttatttactg ctttacc 527

<210> 811
<211> 398
<212> DNA
<213> Homo sapiens

<400> 811
gctcctgcat tagtnnaact gaggaatccc agtgattcaa gagtcattcc agagaaatac 60
acgactgaag atgactggtt acccttctag aaagagggga acaaggcctc cctagttcct 120
tttgcttccc agtgaataca ccgaggcaga agagcctttc ctagaaaatg tcctgggcca 180
ttatcttcaa ggggcttcag aacttctaag aagtgtaggt atccttttgc aagggaaaat 240
gtatatgcct taacgtaggc gatttttgtg gcacctttct caatgaagaa aaggtgtctt 300

tttctccaaa ctaatttgct aattaaccta tcagtcacta tttacacatg aaacagaatt 360
cactccagat tgttcaaatg aaaaacattt ataaaagg 398

<210> 812
<211> 348
<212> DNA
<213> Homo sapiens

<400> 812
ggttctggtt aaagccaaaa ttccagaaaa gacaagtcag cactgcccat ggcagggata 60
cagtgtgaaa gcaactcaaa taacacctgt tttttgaaga tgccacaggc agagtgttgg 120
agccagaggg ccaagacact gaggaagaag agccaagcta ctgctataaa gaaggagtgt 180
ccccttataa atgaagaaca aagaagaagg agaatacatt attatctact tataaatcac 240
acagagacac aaaaatagtg aggtagttag tacgtaaaac aggccatata ctagctagaa 300
aggcaaagcc tactaaagaa aaatatttga ataaaggaaa tgggatac 348

<210> 813
<211> 407
<212> DNA
<213> Homo sapiens

<400> 813
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gggatttttg ttggaccgcc tgggaaaaag aagctctcct tccattggat ttgaaatgag 120
caaggcgtca gtctggatct gcaggtgcct gccctgcggc cacatggaga gtggctgccg 180
aggactgaag ctcacaagga gggaggcaga ggacacggat gtggtgagat acggtcctaa 240
cagcatcatt tgagccctgg attcagccct gcctgccttg aaaccaatac ataggcccca 300
aatatattat ttggaatata tatatttgga atatatatta ttagaaacca atatattaga 360
aaccnatttt aaaaagctta taaatnggcn gtgtttttgt ttaatcc 407

<210> 814
<211> 442
<212> DNA
<213> Homo sapiens

<400> 814
ggtaatcact ttgatcagta tgaggaagga cacttggaaa ttgaacaagc gtcacttgac 60
aagcctatag aatcgggaga acagatccca ttccaatcnt tgtcaagtat gatgtcatgg 120
gcatgggtcg catggaaatg gagcttgatt atgctgaaga tgctaccgaa cggcgccgtg 180
tcctagaagt agaaaaagaa gacacagaag agctgagaca aaagtacaag gattatgttg 240
acaaagagaa ggcaattgcc aaagccttgg aagacctcag agccaacttt tattgtgaac 300
tgtgtgataa gcaatatcag aaacatcagg aatttgataa ccatatcaac tcctatgatc 360
atgcccacna gccgagattt naagattttt aacccagaga gagtttgctc aaaatgtctt 420
ttcaanatcc cgcagggatg ag 442

<210> 815
<211> 405

<212> DNA
<213> Homo sapiens

<400> 815
cacttggggc acatgaagac tttgtacgac cttttctctg aatggaaaat gaattctcct 60
gcactcagca tatcaaatcc tgagagactt tcctggaccg actttggcca cctcaatttc 120
tgaaatgtta tactgattac ttctttaaga tattgtttgg cccaaggtca tgtaacatat 180
gagttcattc tgtgcatgaa gctcccccaga gaacaacggt acacaatgtc agtttggtta 240
tggcatctga aaactcataa gagcagactt tcattaaaag cagtattacc cccagcccctt 300
gccttctgag aattcacata tgaataatta ggagtctgta agtaggggcc tacctgnggg 360
acaaatttct ccccnggttt ttngaaannn aaaaagggat ttttt 405

<210> 816
<211> 330
<212> DNA
<213> Homo sapiens

<400> 816
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ttcatgccct ctcagctctc aggagcgtcc agcagcctca gaactggagc accatgatga 120
caggaggaaa agacagctgg gctgctaagc agcagcagag gggacctcac gtgttataac 180
tacacatttg ggtgttgctt tgtttaatgt ctgtctctgc catgaaatgc aagctgtaag 240
ggcagagcct gtgtcttttg ctcattgttc tttcccagca cctggaacac tgcatgcaca 300
taacaggccc ttaataaaaa tttggtgaat 330

<210> 817
<211> 363
<212> DNA
<213> Homo sapiens

<400> 817
aactgagctg gactggcatt ctatgctcat cctgggtctt tctttgtctg gttggctgca 60
tttggaagga ccttgctgaa cttgacctct ggttatgctc tgaaactgtt ctcttaaaaa 120
gctaacatgg agtggtcctg ccagccctgg caatgtctca ccacctgtgc atcagtgcca 180
gccaagttgg aagataggat ggatgcctgc acacttaaat ttttaattgt tgacatctct 240
aagtctggaa gtaattttgt caataatgta ttagagttac atagctagat tattctacag 300
taagtttatg ggtatactc agtttatttc attcaataaa ttgtataata aacacagatc 360
ccg 363

<210> 818
<211> 433
<212> DNA
<213> Homo sapiens

<400> 818
agaactgagg ttctaatggc caaactggca aagttcctgc tgttgccctc acctccaagg 60
ctggtgctcc tggactcagg gtgtgttcca ggtgcctgaa gcatggccca caccagaaaa 120

aggtgctctg taagggcaga aaccaggtcc tcacaccatc ggtgcatgat aaaaattaac 180
tgaccaaata acacggtggt accctcttca aggcaacttc ggagtcagac atgcctacgt 240
tctccttcct gctctgccac atgtgtgacc ctggacaggg tcctccatcc tcttggcctc 300
agtgtctttg ccagcaagct gggaataaga atcctgtgtc atggggttgt cataaggggg 360
aaatgagatg acctaaaggg ncatttttta acntaannaa atgcctttca aagcaaaata 420
aaaaaggggc tta 433

<210> 819
<211> 88
<212> DNA
<213> Homo sapiens

<400> 819
gcataatttc agagaacctg taagaaacct cttcaagcta ttgcaagaaa cactcacttc 60
taaaaataaa gagaaatctg ttttccct 88

<210> 820
<211> 423
<212> DNA
<213> Homo sapiens

<400> 820
gcctatccac agctcttcaa ataaagcgct gngangnnag cnaaagtgca ggggctcctt 60
gagaactttc cagggctaac cagctgctga ggagtggcct ccaggaaaga gagaagcact 120
ctgattcagg cagtgattta cacctaaaat accaactcca tcatatcttc agaacaattc 180
ttctagacct tgcatctaaa tatggagtcg ttaactaaca acgaacaaaa cctctggatg 240
gccgaaggac ctaggctata cagaaagctg tgaattacca atgagaacgc agtgagtcaa 300
aagaataatg gaattaaata agttcagagg ctttaagtgt ttcttaaaac acttatctat 360
gaaccoctaa tcttagtcat ttctggcaca gttggtattc ataagcattt gatcatcatt 420
ctg 423

<210> 821
<211> 234
<212> DNA
<213> Homo sapiens

<400> 821
ctagttctct tggagatgac tgatggcatg aattctactt gcatggagtc cccgagaaac 60
cactcctctt cttcaaaaaa gtacactaaa tctcaggaca aactgggatg accagttatc 120
actgctgcca accctgtttt gtgaattcca tttaagatgt ccaactgaga acaaattatg 180
tctcaaataa gattgtattc acagaatgat ggaactaaag ttcttggtaa attt 234

<210> 822
<211> 294
<212> DNA
<213> Homo sapiens

<400> 822
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aaaggaaact cattggaaat gttcagagag gaaacgatga cagtgataat tccaaatatg 120
atgctttctc cataaactat ccatagagat ggcacagctc tcgatcaacc tttgcctggt 180
tggcttgaaa tgttttaagt ctttgacata aaaattgtga aaggactcgt cgtttccaaa 240
gtgagatgaa gattttgtta ctgctgttta ttaaaatttt ttcgttgtgt ttcc 294

<210> 823
<211> 451
<212> DNA
<213> Homo sapiens

<400> 823
cacgtggaaa gcaagacccc tgagggcgca ggttttagtc aactttcatt cagtgccgct 60
tctacagagt tgaacacttt ccggtacatt aaatgctctc gttggttcag aaagaacact 120
ttgaaaagcc tgtgttttga cgtctactca gaagtattgg aatcaatgaa gagtgggaca 180
ctgaatctgg atcctctcta aggaatcgtt ttccagaata catcaaatgt tacctgcttt 240
gtaaacctct ccaattctct caattccctc tgtcatcatt taagcactga ccatcagacc 300
ttcctgtacc tagacagcag ctttctattg gattctctgc ctcaggcacc gctctcctcc 360
attcaaacct tcacaatcat tatctctaac gtgaagacca tgccgnctca gggaacccca 420
gaagggatcn tngaaccttt ccaaaaaaaa c 451

<210> 824
<211> 404
<212> DNA
<213> Homo sapiens

<400> 824
aacatttaag gaagtttcta ttttaaacca gccttggagg gttttcatga caaggaattg 60
cacattggat gatcatttct accttttgca ataactactt cttatttgca agttgtgttt 120
aagtgaacaa agacaatgat accctgttga gctggtaggt aggaagaacc agcgaagcgc 180
acagttaccg gagaggttat ttgcccaatg ttgagaaaca tatgtgtgta ttagaaaaaa 240
tcacatcgac tcccaggaat cctgcaacat actgcaactg tgatgctgac cagaatgagt 300
ggagatttcc tcatgatttc tctgtgtgag atgcagagtt atcattccac ttgaatctgt 360
gaaaagtgtc tgattaaaaa tcatacngat aattaccatc cggg 404

<210> 825
<211> 387
<212> DNA
<213> Homo sapiens

<400> 825
actgaccgga atgataacga cttgcagcgc ggtgttgccg tccccaacca cccctgtttt 60
ctgacaacaa gggagcgcgg gagaccggag cgctgaaccc aaatccctca gcagttgcac 120
ttcattaagt caaaatgtga caagaagctt agagagcaac ttgcagatct gatcacacag 180
aacaatcagg gaggaaactt tccaggagtt ggtcgggggt ggaggaggga ggggagggcc 240
anagatgtgt acgtacaggg accaggacat gcacggggtc ctgtacccca cctgcccagg 300

gcaggtgtcc tggctgatgg gagcagggaa gctgtccctg ggtgggatct gggaccctgg 360
gatactggga ccccagtggg ggcctaa 387

<210> 826
<211> 335
<212> DNA
<213> Homo sapiens

<400> 826
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atgtcagagc ctcaaaaaga cgtatgcaag agaagcaact gggcctggtt ctgctgccct 120
ggcccccagt caaggctgct taaatgtcac caactccagt cctgctctgt tccacagcta 180
gtcctggctg tgattttctc ccaaatagga cacagatatt aactaaggtt ctgggaagag 240
gaagcaaaag aaagagaaaa agcaaactac tgaatgcact aaacattttt ttaaagtttt 300
attgaaagga aaatagaggt taacttgaag gaaac 335

<210> 827
<211> 241
<212> DNA
<213> Homo sapiens

<400> 827
tgatgcaaga tggtcctttc tgagcagagc tcccctcgct cagtgctcct ttgtttcacg 60
tagaagatct tcttgagggg actgtgtggc cagtgcagcc caggcctccc caccctgcac 120
cgttcaacag aagagcagct gacgcagggg gccctcaaca tgctcaccca aaagtcagcg 180
agattctgca ccggcccact agccttccaa ttgtaaacta aaaataaaat cttggccagg 240
c 241

<210> 828
<211> 419
<212> DNA
<213> Homo sapiens

<400> 828
gcagagaaac agatgaaatg actcactgag gagggaagca ctgggatgcc tcctaacctg 60
ggacggcttc ctcttctgca gcgtctgtgt ttgtcagtgt ctcctctgga tcaggcaggc 120
ctcagacctc actaagctat tccactcaac tctttcttcc cgtgcttcct gactccaagg 180
tatcaggcaa acttgttgat ccatttagac ttcactctca ccctgcttgt ctcttttctt 240
cgcgcacacc agagctaccc agaaccgcgg tgatgccttt ccctggcagg gtcaggccta 300
ctgtggcagt gtcatgaacc tttcctaagc aggatttgtg aagagggcaa aagctggcat 360
cagcaagaca tgttttggtt tagacgtctc agtagacatt gcagcaagtt aactattgg 419

<210> 829
<211> 440
<212> DNA
<213> Homo sapiens

<400> 829
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gggtcagatg tggcactcag aattagggga aggattggtg atgccagaac atctggtgaa 120
gccggcacct caaggcactc ctcaagcctg gaaagcctca ccaataggat tgatccagaa 180
tatgttccag caaaaactac agcagagtaa ctttgacaag aaaaatgttc acttgctacc 240
taaggagagt ctctgtctcc tgacctctga atttcgaaat cctcagctct ggctgccacg 300
cagtgggaac cgaatgagat ggctgggcag ggttctgcaa cacagcagaa accccaggct 360
tcccaagacc caggatcaga actgnataat gncacttctg cctcactttg gtggacnaaa 420
gatttcacaa agaatatttt 440

<210> 830
<211> 464
<212> DNA
<213> Homo sapiens

<400> 830
acagagtctg gctctgttgc ccaggctgaa agtgcaatgg gtgcaatcag aatttactgc 60
agcctcgacc tcctgggctc aagtgatcct cctgactcac tcagcttcct aagtagctgg 120
gactactgga aaattaacct cattcagact gaggagaaca gaaatacttt gagaaatctc 180
acaaaatagc catcataatg tgaagaagcc gaagcagcct gtgaagaggc gctagtggaa 240
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acttgccagc cacaggagtg agccaacttg agagtggatc tttcagtccc agtggagcca 360
tctcagctga cacaccatgg taaaaagatg aaccatcctt gctgatcctt gccagtgctg 420
cagatacata agcaaaataa atggttttgt tggtttaagc cact 464

<210> 831
<211> 480
<212> DNA
<213> Homo sapiens

<400> 831
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tttgaattga atggaaggcc aaagagcatg aggtctgaag tttaggatgt gaaggagaaa 120
agaacataac ctcaaaaacc caattttaat gatatttaaa aggcctattc cctccagaaa 180
tgtcaacatt actcaggagt atagcaaaaa acagcctgga gttttcatga tgtgaacgtg 240
agaccaaagt cacactgagg agagattaaa cttggaacat gattgccagt aaagaagata 300
actcctgcct agaaaaagcc cagctggtga cttccgttac agaattcaca accacactgg 360
gttcacaagc ccttcttccc acatggaagc cccctttttct taaatgtccc agattctctc 420
ttctttagat tggatgccag tgcctcttct tcataaaaag tgctcagctt ttgaaaaaaa 480

<210> 832
<211> 319
<212> DNA
<213> Homo sapiens

<400> 832
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cctgaatggg gaagagaggg gtggaattac aagtaggttg cttcaatttt gcataaccct 120
ggataccccc ctgtgagggt gtgaggcatg tgaaagccat ctgtgttgga gcagaaaaca 180
agttgagagc tactgaatca gagcattcac atcaaagaat gaatgcaaac tggctctcac 240
caccagaagc catgttcaca gggagaagga gaatggacag agactctcaa ataaaccaca 300
aaacaatggt gaaaaaaac 319

<210> 833
<211> 249
<212> DNA
<213> Homo sapiens

<400> 833
gccctcctgc gcaagtaact caccatcttc ctgtgcccag ctatcaccac gacacctgca 60
ggtgagctca ctgcaagctt ggcgtcgtgg tgctgcgcac agccctcttc agcacacagt 120
gtcagcaccg tcctataaan tctccagcca gcctttgttt ctttgcagtc ggcatctctc 180
atgcaggctg ccctgtctcc ttgcaaccta tttttctact ttctccaata aatcagcctt 240
tttctgcct 249

<210> 834
<211> 428
<212> DNA
<213> Homo sapiens

<400> 834
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aagnganctt gaccgactaa accgagagtg cctcagagag caaataccca tcggncacgt 120
acttctcnct ttccagacgg gcnctggnat gaaccctaac tgttcacaga ctcctccaca 180
ggcccatttt ctatgcnatt ctgtggnttc ctgantcttc atacccaaaa actangaaga 240
acctccagag gggacacacc gccatnatga gagcctggct gganctggac ttcnntcctc 300
tctgcaagat gaagcaccat ntcgaaatga acngcagagt ccgacccccca ctgctggtcc 360
agcgnggata tgaggtgtgg actggaatgc tcttttgcat tatncactgg ggccatgatg 420
tgccgaaa 428

<210> 835
<211> 507
<212> DNA
<213> Homo sapiens

<400> 835
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gattcatttc tttgcaccct cagttaagga aagacactac cattcaaata gacaagctac 120
ataagacaga ctaccgtata cactnggaat cacgagtctc caatcaagaa agngggattt 180
tgtcgtctct tttcctgtta aagaaacctg ggtttaagac aagctcttgc taccttataa 240
aaccatttgg ctctaaatca nattaaggaa gaaaagggaa gaagcctaaa ggaaaatggg 300
gtcatggcaa aaaatatttc cgggacaaat gggtccacca tgaatggcct ggaaagaact 360
ggcttcttca ttttttaact tgggggataa aaagaagggg acatttcttc ccattcaaag 420
gaagcttgct tcttggaatt tgggtctatg gttttcttgg atgccatttt tttacttaaa 480

ccgccantta ccattagggg gttaaat 507

<210> 836
<211> 447
<212> DNA
<213> Homo sapiens

<400> 836
gtacacctgg agtcctaagc ccgggagaag agggcacagc cccacttcct ctggtaccag 60
tagggccctc ttcagagaca gacgtgccta ggaaggtgca ggtcctcctc tgctgaagat 120
cctcacattc caggggtgca agaggggccc ctgcaaagtc agtctgctca gacctaagtc 180
ttggtgttat ctacttaaca agtgaagggg ctgagaggaa ggtcagagtg actaacaaaa 240
ccagtcctga ggccttgaca cctgaggaca ggattgctgt caataaaaat gtagctgacc 300
ttaagagtca cagcctgaaa gaatctcaaa atggnctaaa gtatatggga agctttcttt 360
cttattctgg taccttaaaa gagcatggca aagagcactg tggggcagaa ggaaggatct 420
gaaaattcca ttctgatgag acatcta 447

<210> 837
<211> 453
<212> DNA
<213> Homo sapiens

<400> 837
gttccgtgtg gctgctctga gaattctccc accatagaga gatgggtgat ccctttgttc 60
tgcatgaagt caccaatcca ggcaccatgg aaggactctg tgaggagggc ctccccctctg 120
agaagatgcc tagccagcag ggacctcatg cttgagttca gatgggttgc cagacagatg 180
aaaactccag acatgacagc tcctcctctg aggctttgcc tgggttcttc cagccacacc 240
agaacagcac cccacctgca acacacaccc tcacccaagc cccaccagaa tactgcacat 300
cggctatgtt tgtcagaata caaaaacaga gacagttttc agaaagatat tctttattgt 360
cataagttgc cacgggtggg atggtcaagc gagctggcag aggctangan gaaatttttg 420
tgtccctggc tggagaagtg atctgggtgt cac 453

<210> 838
<211> 406
<212> DNA
<213> Homo sapiens

<400> 838
aggtgagttt ctcagagcat ctaacaggtc acccaaaaaa ggaggatgga aagagacatc 60
aagtcagaag aatggcactc acattctctc tctgctggag attaaccaca tgcccttcta 120
tgatgataca actgcagatg agcagagacc tttaaaatat gagctccagt ccccaccttc 180
ctggccttgt tgtggtatag gcactacggc cctgctcccc tttcctgagt caatcctaga 240
gatctggcac atccttcagg ggagatctag aataattcac cttctttgac atgctattca 300
ctatgcctag gtgaactctt ttccagcatg ctcccttact tcagctacaa tcttacttgc 360
ttctagctat gcttgcccag tcaatataaa cacactttga taccat 406

<210> 839

<211> 116
<212> DNA
<213> Homo sapiens

<400> 839
aaccaggaac cataatctca cactgggatt atggactgct gtcttctata tcactgctga 60
gccatggacg gagttggaca cagggcaaat aaaatgccac aaagttttct accatt 116

<210> 840
<211> 392
<212> DNA
<213> Homo sapiens

<400> 840
atccagagga agaggagatc tgactgtcat ctgcacatgg aacaacagaa actgattttt 60
taagatatgg tttcatctga tgcactgtat cactgcctaa gacagcaatc ccttgatgtg 120
ccagagattc tgatgcccct gtaggtgatt gctgggaact tgtttttctg tttcctcttt 180
tgggatcata attggaaagg tcctgatcac aaataatatt tgatggatgg gcagcatttt 240
cggcaaggac acttgcagtt tctgaaatat ttaatttgcc gattactggg gaagaaacat 300
agaattcatg gtctttgtct gtagcttctc taagatcatt ctctttctgn gaatattctg 360
gttgaccaat aaaagcaaca ggttgggatg gt 392

<210> 841
<211> 444
<212> DNA
<213> Homo sapiens

<400> 841
atacagagtt gaagagaaga gagcaccagg gatccaccag gcaactgcgt tacagaaaga 60
aagtcacgca caggaaaagc agatttctga ttctgccacc aggaagggtc aaagtctgga 120
cagcacttgg tcaggagcct ggcttccctt tcttgaaaaa catcacatgt aaacatctaa 180
ctgagagctt ggtacacagc aggctctgag tgttggcccc atcacgatga caaccaaggg 240
ctaattatga aataaggagg acacaagaaa agacactatc aaggatacag ttttttaaa 300
aaggtggggg aaagttcatc tttttttaaa aaagcatcca tagacttaaa attttttgt 360
ttggggtctg taaaaaaata gcaatatggg tgaaacgcta tgataaaaaa ttgcccaaat 420
tcttgttatg ttaaaatggt actg 444

<210> 842
<211> 300
<212> DNA
<213> Homo sapiens

<400> 842
gttcaggaaa taactcacca gaaaatgata tctgagcaaa gacctaaaga agaagcagcg 60
agctatgggg atatgtgcag gaagagtatt ccagacagag ggagcctcgg tgaaagaccc 120
tgtggtggga gcatcctggc ttgctcatgg ggcatcaagg aggccagtcc acctgcagca 180
gagtcaggac agggctttgg ctttgtacaa gcttaattaa gacaaagaaa cagtaaaaca 240

cccagaataa aacactttat aatctggaga tcattaataa aactaaatac ggatttaaat 300

<210> 843
<211> 214
<212> DNA
<213> Homo sapiens

<400> 843
ggatcagttc tttgctcttt gaaacgaaga tgatccgtct cacactgaaa gtttcctatc 60
gtgaggttca gtgtcatcta gagtcaacgg atgaagtata agtgttcact gtggaatttc 120
tacaacacaa aaagaagagg ctggataaag aagataaact gaatattgaa actgttcctt 180
ttccattaaa aaatagcaaa aaagttttcc ctgt 214

<210> 844
<211> 422
<212> DNA
<213> Homo sapiens

<400> 844
gcaagcagaa ccctggaatg gcttcctcag accctgtcct gctcagactt cacttcctgt 60
cactctcccg ttgttcactg tgctccagac atgccactga cttgctggtc cagtagcctc 120
cagtcttcat agagaaaact ggagaggctg tcctaacttc acctcagcat tggccgtggc 180
agcgagggcc tgccctgtgt cttgtgcgtg ctcaccaccc tttcctctgt acctctgcat 240
ggcgcataaa cactaggcac agagacttga aaatcatcca tctttccaaa cctcaccgaa 300
ttcacaactg gccagcacta gagaggaccc tgacctcatg gctgcacagt cactgggggg 360
tgcagacagt aaatccggga tcactggaca agtcacactg caacaagtgc tatgggaatg 420
ca 422

<210> 845
<211> 463
<212> DNA
<213> Homo sapiens

<400> 845
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caagcttata gtctaatagg aacgtctaca ctgagaaaga aaaaaaagaa aagaaggaag 120
aaaagaagaa acccttctct gacacttcat agacaaaaaa caagaggaga tgattattta 180
agttcatcag tgggagtggc acctgccctg tcctactctg gttactaggg aagtaacaga 240
ctccttggaa aaaacaacgt tgagatggag agggaagggg tgaaactggg aaatgctaaa 300
tctgaattca gagtatctgg cctcatcatt cagatatttt aagggataaa gggaagttgn 360
cgggnggaaa tctgaaggng aattaaataa ttggaagtta tgatgaattg ccattccatc 420
tgngtattgc ctttaatctc tggtctggct cttctacctg cca 463

<210> 846
<211> 230
<212> DNA
<213> Homo sapiens

<400> 846
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tgggtgaaaa caacgaactg tgaatggtcc agccatcacc aataagacac gtaacaactt 120
ttcccacctc gcttcacgct gccaggcaac gcaggctggc attgttgtag tgagttgctt 180
ctgttcctca caagccagga tttaataaca gaataaagga atgaactcgc 230

<210> 847
<211> 391
<212> DNA
<213> Homo sapiens

<400> 847
gcttgcccttt tggaagcagc caccaggctg tgaggaagtc caggccacat ggaaagacca 60
catgtagata ttctgaccaa caggcctggt taacgtctca gatgtcatgt gagtgagtga 120
gcaaccatat ccctctagca cccagccttc gagtcttcca gctgagatcc caggcattgt 180
ggagcacaga agcgtcattc cccctttgct ctgtccaagt tcctgatcca cataatccat 240
gagcatacta aacgattgtt gtataccact gagtttgggg gtaatttgct acacagtaat 300
aaacaattgg aacaaaaaaa aaaaggccag ngnggccaat tcaanttgga nttnaccnng 360
gtngacttng ttnaaagggg gggacttccc a 391

<210> 848
<211> 442
<212> DNA
<213> Homo sapiens

<400> 848
agagaagagg gtgtttccaa gggaaagctt cagaagccca agcccagcta actttctggg 60
aagccctgat gatacccccca ggaacgcagc aactgcaaat caaacctcat caaaatggca 120
ccagctgacc ctcctctcca cccagggttt ctcaacaccc ctggcaggat gcgaggggat 180
gaggagtcct cgggcttgga cccccgaact gtggtcatca tttcatcaga tgccagctgt 240
gtagcaacaa gagttgctat ggaaaacaac cactacagca acagactgaa atcactccaa 300
aaaaggagcc gncactcatt ccaccaacat accactgggg acgcgggaaa gcaaaaccct 360
tgggttaaga acaacattcc cactcccctc cccagtttcc atcctagtaa aaattctcgt 420
gcttgtttgc atttttaagt tc 442

<210> 849
<211> 106
<212> DNA
<213> Homo sapiens

<400> 849
gtgangacac ancaagaggc accaccttgg aagcagacag ctttcanaga ggagnngaca 60
ccttgatctt ggacgtccct gcctncagaa ctgtgagaaa taaatt 106

<210> 850
<211> 438
<212> DNA

<213> Homo sapiens

<400> 850
ctaaacaagc actggcctca agagaagcaa tattaaaaca atttgcagct caccaccagc 60
cgctgactaa cggcgccccc ctgttccaac agccccanct acngctntga ttggacaaga 120
ggctgatttc agttancttc ctcctgatga gaaaaccaca gccatggact gattctggcc 180
gntttacana ggntgngnac ttggntgcct ttgagtccta aaaaggaggt gtagggccta 240
attgtaatac atgtaaatgt taattctnca ccccaaagca cacatggtta tatnacaccc 300
agccgtgtta natgnacaca tgcctcaaga ccaccttcat gagtatttga agctcttcgn 360
ataacctgtt gactatngta tgttttggcc aacctgttca actaaaaatt tctgtntaat 420
tncctctctc cctcaaaa 438

<210> 851
<211> 224
<212> DNA
<213> Homo sapiens

<400> 851
gaaatgaagg atttcttatt ctgaggaagg gagagacgcc gaggaagaca ggacttgagg 60
ttttactacc ttcgttattc gaactcccct ctaacttgtt cctgtactag aaacccactc 120
actatggaga aggaaggaga ggggctgaac tgatggacaa acgttgtaaa taataggttt 180
tatgtaatcc acatataaat aaattaatcg cctgactcgc tccg 224

<210> 852
<211> 458
<212> DNA
<213> Homo sapiens

<400> 852
ncacanntga gatcttggct gnttatgaan canggaacaa gcnccgnttt tnagaagcaa 60
gctcaagaga tgatgaatga aggaaggtgg agctccgaag accatgaaga actgctacag 120
aagaaaacaa gctttcaata aaataaaaga gacatcaatc acacatttta cccatttatg 180
aaacatgctc aggacaaggt actcagacgt gaagaagcat tcccaggaac catcttggag 240
aactggactt ggtaacatga gagctgggaa gtcccaattc ttggtcatga agagtctacc 300
acgaagagaa ttggtttgga aaccagaagg ctaactttta catgaggcac cagggcttat 360
gcccccccaga ttttcagaga aggacaataa tggggtattt ctggatgttg aaatcctagg 420
attgatctga cagcacaaac caaatgccag cagtttcc 458

<210> 853
<211> 438
<212> DNA
<213> Homo sapiens

<400> 853
atgtttgcat cctgatgaac tgacaccact tggacccatg actcatacca aggaaataaa 60
tcaactggtc ctgtaactcc cacccagaag ctgactcggc atgcgaagac agttccaaca 120
ctcctgtgat ttcatctcca accaatcagt agcacccatt ccccagcccc ctgcctgtca 180

aattatcctt taaaaaccct accctctgag ttctcagaga ggtggatttg agaaatatct 240
cccatctttt tttcttttac aactggcaaa tatagatgag tctgtagcca taccagaccc 300
atgtggccca actttcacgt aacaaaagta agtacagngn tttttaagtt gccatnggac 360
cctcaaggtc atgtaatctg agcatgccca gatggaccaa gtgttcaacc acagagggaa 420
cctgattgct ctgactca 438

<210> 854
<211> 160
<212> DNA
<213> Homo sapiens

<400> 854
ttttattcac agatgaccag accaccagag agacctatcg aagtctacat ttcaaagaac 60
tttgcctcac cttggttgat aataggagga actacagcaa gagggtaaaa atttgttaga 120
ataatcttga taatggataa atctacatct gctatatccc 160

<210> 855
<211> 138
<212> DNA
<213> Homo sapiens

<400> 855
ctacctgcat taagtcanca actgaggaac caggnaacca taattctcan actagggnat 60
tatggacttg ctgtctntna tancactgct aganccatgg gcggagntgg atacagggna 120
taataaaatg ccacaaag 138

<210> 856
<211> 436
<212> DNA
<213> Homo sapiens

<400> 856
gtggggtctt tcagtgcctg ttttcccgcc cacgtggagc tctcatcatt tcctgagtaa 60
aagtgaactt cccgactcag ccgcaagtgc ctcgagagca gagacccatc gtccacgtcc 120
ttctcacttt ccagacaggc actggcatca acgctaactg ttcacagact cctccacagg 180
cccattttct atgcgattct gttgtttcct gaatcctcaa acccaaagac taaatgaacc 240
tccagagggg accaggccag agagagcctg gctggagctg gacttctctc ctctctgcag 300
atgaagcagc ggccgaaatg aaatgcagag tcgacccccca nctggttgtt ccagggggga 360
tatcaggggc atctgtttct ttcttttgca ttctcagngg ataccatgtt gcacgaaatc 420
tgtggctgct tttgtt 436

<210> 857
<211> 442
<212> DNA
<213> Homo sapiens

<400> 857

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ccgctccata tgccttgtca caagtacact cactgaaaca ttaattcacg aagagattgc 120
aacaagacca aaacgaaaga ggaacagggc ctgacaatgt tcagagaagg aaagccgaag 180
aagtaaccat ccccaagtta aaaatgacgt ggggatgaaa aaataggttg cctgttgtat 240
ttgtcattga aatgcacaat cttgtttact gtttatcttg agactctggg agctctcctg 300
ctgcttagga aaaaagaggc aaaggnttan gaagaaatgc ttggccttan naaagagagg 360
cnttagaaac cctagagaga atgggaggng taaatagtat gtgggcattt ggcaatcacc 420
acaaagaaat gggagacaaa aa 442

<210> 858
<211> 443
<212> DNA
<213> Homo sapiens

<400> 858
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ttggacaata agctgcatat ctgccggaaa cctgggactg gcaatggaga tgagaagaga 120
atcagaaggg atatgtctga tgacatagaa gctgtggaat ccattcttca gggtctaaac 180
tcaagcctgg tccttagttc tccgtactgt attcttcctg acctccagac ctgagcgtcc 240
tccccttcaa aagacaaagc catccaaaga gtctgagcac tccaagtgag cagcttgaag 300
agtgagagac gtggacagag ggaagggcag gtctgngcaa cctgngggcc ttaaacccca 360
cctntggcct tntccagnga agccacactc angatttaag agaacttgtg atcaacttgg 420
ggtatttgca ccccacgaaa aga 443

<210> 859
<211> 312
<212> DNA
<213> Homo sapiens

<400> 859
gctgggagat taatgctgtc ctcaaagtga agagtcacca ctacttgtca agtcatgtca 60
tctctgcagc cacgtgcatt ttgtaagctg ggaagaataa acagacattt ctgacatttt 120
tgcttgagat ttaacctcag cgcgtcaaga gatagagagg ggaacagaaa taaataaaat 180
gtggctaaat aaggactgtt tatcacaaac acaaggcaga gatctggtga ccatatctga 240
ctttgaaatc tgtgtctcca ggaagaggaa catcacacac cagggcctga tgtggggtgg 300
ggggaggggg ga 312

<210> 860
<211> 418
<212> DNA
<213> Homo sapiens

<400> 860
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agaccctgtc atcctgagaa tcgtccccag ggggaaacca tctttttcta aggcggaatt 120
tctcaacggt ggaactactg acattttgga ccagtgttca tggaagcctg tgttgagaga 180
gccacagagc aaagtatctg ggaccactga gtcaccatat ggaggagagc tacctggaac 240

attcagggtg gacttcgtat aagtgagagg tcaacagatg tcctctctgt tcctggtcac 300
cgtgctaggt gtggaggaca cagagaggga gaagaccttt ntngcttttt gggagctanc 360
aagccggtag aaaacttnta agcaggaaag taaaatgatc agggttttaa aactcaat 418

<210> 861
<211> 262
<212> DNA
<213> Homo sapiens

<400> 861
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tgtacatgtt cctgctttta catgagaggc acatgcctcc aatataacca ctggtccaag 120
aaagatagga aatacatgga gaaaacctgg tttctatctg aagtttggag ccacccccaac 180
aaaaaaaagc ctgaagaagg ggcactccaa gccactcaaa aacacatgag caagaaataa 240
atgcctattg ctgatgccac tg 262

<210> 862
<211> 298
<212> DNA
<213> Homo sapiens

<400> 862
gacaccacga ggcgaaggaa ggaagagcga gcagatgtga gctcctaagc acggccgtct 60
ccacccactg ctgcactcct cagccttccc agacacagcc tggtttttcc tactgcacat 120
ggcactttca tgaaaggccg cctgttctca catctatctc ctgaaactcc tttaggagtg 180
gagacaaacg ggcacaagta acttgagttg taaagttcag gaaaatttag ataagtgctt 240
gatcataaca catcagctgg tttaatggac catcttcgca taaaacactt catccttg 298

<210> 863
<211> 156
<212> DNA
<213> Homo sapiens

<400> 863
gtctgaggtg aaaccagata atttgctgaa catctaagaa gcttttagga aactacactt 60
cggaggagag tgctgtgcat tggaaaattg gaaacatctc aaatattaca tgaggctttt 120
gcaggcggga ttaccacgca gcttcctgct cctgcc 156

<210> 864
<211> 12
<212> DNA
<213> Homo sapiens

<400> 864
attcttgcca ag 12

<210> 865

<211> 180
<212> DNA
<213> Homo sapiens

<400> 865
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aatgaatctg agaaagctta aaatcggaaa tgctgctcta gtaatggttc tcaaaccctg 120
gtggtcttga catacaggtc ttattaaaac acagttgctg ggctccacct aaaaaaaaac 180

<210> 866
<211> 182
<212> DNA
<213> Homo sapiens

<400> 866
gatctgggtt ggaactgctc tgcaaagata agtggaagaa actgtttatt tgtaagagaa 60
agaatgatga tggcagaaaa aggagagctg aatgcagtca ctaagaaaat tttgcaccct 120
gagactccgt accacgatcc tgtaacatta gcaattatga aaattattaa atggttgata 180
tg 182

<210> 867
<211> 457
<212> DNA
<213> Homo sapiens

<400> 867
ggatttgcgt actctattat gaatttctct ttgagaaata atacctgtga gaatgctgct 60
ccttcaatta ggttcaggat tggaggaaaa atcatataaa atagttggta atctttcttc 120
tctagaaagt ggcaacgata tatagtactg ttgaaccatg cctgccagtg tcaattcctg 180
aaatggcaaa agaaaaggga agaagagaag ataatgctat aatgatcagc tcccaaacct 240
ctacttaaag cataaatgga gaaaagaaag ctcggtgtag tgctacggaa cactattcgg 300
cattaagcag agtaaatagc ttagtcaaca gtgtgggcca ttgtcagtct ttatttgtca 360
tctctcactg agtgatcaca actcagcctc ttatgtgtcc tggaagtgtc caatctccaa 420
gttaactatt tattaagagg agatgcatct taaaagg 457

<210> 868
<211> 259
<212> DNA
<213> Homo sapiens

<400> 868
gaactccggg tgaggacgac aagagctgag ctcgggtgct tgccttctgc actctcggga 60
ggaggcacca gcatgggcac ccttcacagt tcgggcccct cactcacaaa cgtctggcac 120
atggaaacaa gctggcaaaa agattgtttt tttcttccgt actttttgtt ataagcctgt 180
ggtgaagtgt ccatatctgg cataaatgaa tgtgagtggt cttgggaatc taaatataac 240
atgtttctaa gttacacac 259

<210> 869
<211> 436
<212> DNA
<213> Homo sapiens

<400> 869
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ggatgcgtaa catggccgag aaatccaccc atgctgctga gagctactgc gccatggggt 120
catgtgtcac ctaactgact tagcccagcc tgactgatcc cccgtgtgtg accagacatc 180
agcacattca gaggacctca tactgggaat tggtggacct ttcagaatgg acatgaccac 240
tcaaagtagg gacattactc gctatttgat ggcccatgtg ggatcaaagg ccactggggt 300
tccctcaagg cacagcacac ttagaatccc ataagtcctc agttctaagg catgtatttt 360
tcatactttt gataattctg aaatcaaagt atagctttct agtagatatt aaaactcatt 420
ttcagaatcc tgcaga 436

<210> 870
<211> 458
<212> DNA
<213> Homo sapiens

<400> 870
gcctgggatg acctctgcct gttttcaacc attattgatg cgcaatttat gagaggatga 60
tgtggcaaaa tgatttgaaa attggaagtg atttactgca caacttaaat attttgtctt 120
atcattacag caactctata agtaattaat tctggcacca tattttacaa agaactttga 180
caaattggag cccatccaga ggagaacaaa caatcttgtg aagggtctgg aaaccacaac 240
ttgtaaggaa tgatggaaag agctgaggat gtttaccttg gaagagacac attttaagag 300
gaacatgata gcttttttaa aaacactgaa aagaactgtc tggtggaaga gagatttgat 360
ttattcaatg ttactctgga gtatacattt aaagccaaag agtaaaagtt aaatcttaaa 420
ttctctatga tctaataacc aaactttccc aaaccaac 458

<210> 871
<211> 450
<212> DNA
<213> Homo sapiens

<400> 871
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agaagaaaat ccagccacac caggacaggc ctctgaccca cacaactgtg agctcatgaa 120
tgggtgttgt tttcacagct cagtcagtgc tgttttgtta cagagcaaca ggaaacgaat 180
accccctcca cgcagatctt tttctagagc aattaattat gcatacggaa cggatgaaat 240
gtgctaaggg accagtgaag aagctgacgg tgtcctcagg atgaaataga gagggaaaga 300
aatgctattc attccacaaa catttccacc cccanggaag gccctccttc ctgcatntag 360
ccacgattca aggaaaggtg aactcacagg aaaaggagac taaagttctg atagaggaac 420
ttttaccata ggctaccagc cattctttcc 450

<210> 872
<211> 426

<212> DNA
<213> Homo sapiens

<400> 872
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tgagcttgaa cacagaagag aggcgatcag aggagaagat caaaggctgg ggaaggaggc 120
tcacaaggac ttcccacacc agctgacagt ctgtgcagag caggcctgtg cttcctccct 180
cagaaggcag ggctctagca gaatattagg aataaggcat ttctctctta atacagaaga 240
atgaacagtg tcatgtgtgt tggtaattgg taattgctag attgataaat aaatagggca 300
tccaaattca tttctttaat tcttacccta atttttgcat cttccattta taaaatattt 360
taatcatgtt ttatatctaa gcttatatgt ttttgatatt actatcaaaa aataatttaa 420
ttagcc 426

<210> 873
<211> 321
<212> DNA
<213> Homo sapiens

<400> 873
ggtctcactc ttgtcaccca ggctggagtg cagtggcgca acctcagctc actgcagcct 60
tgacttccca ggctcagaca cagactcaga aacttgagac aacgttgccc aagatcattc 120
cacactgaga aaaaaacaca ttagaggcag cagtgttttg aataggtgca tggctagtgt 180
taaataatgg aaagaaattg gaacaagagg caagttgtga agtaaaagtc acaccctggt 240
atgaaaacct gttgtcactg tagcgaaact tgctaattac agaccggctc catcagtagc 300
ttcacaatgc acaaaatcac c 321

<210> 874
<211> 371
<212> DNA
<213> Homo sapiens

<400> 874
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gcagcctaca atggtgtcca tgctgagcac acctcctggt gaacctatgc actcaaatct 120
ctgtccagca cctgcttcct ggggaatcaa ccgaacagat gatgccagga gtagtctgag 180
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cccgttaccg ttggtacacc gagctgataa agcccctgac acaagatggt gatgaaactg 300
gcaaaacttc caatgggggt taaaatggan gggnntacag ggggaaggaa atngnntttg 360
gggtaaaaat a 371

<210> 875
<211> 433
<212> DNA
<213> Homo sapiens

<400> 875
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aggaagacaa agagtaaagc ctttatccca ctgtttggac acacagtgac tccatctcat 120
tgaagcctag gtgatgcact taatcacggt ccaggatcca ccagctatgc aggctcgggc 180
tagaaaacag attgcttcac accatccaga gctcttcagc agcctcacat tgcagtcagg 240
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cccactcagg atacaacatt gaaaacatca gccacgccct gctggatgag ccagggtctg 360
atgaacgggg acttgctcag cctacaggtg tcccccagcc atcttttctt caccagcaca 420
aaagcttcac tcg 433

<210> 876
<211> 328
<212> DNA
<213> Homo sapiens

<400> 876
gttcgtggtc tcgggggctt acatgaatga agcttcgcag accttcgcga ttggccttct 60
tctctttctc tacaggcagc aaagaatatg ccatctacag ccttgcttag caacctcagg 120
agaaagggag ctcttctttc tctagagtcc atagtgcaat cccagagaag cgttgattag 180
ctgtgctagg gctccatgcc catccctgta tccagaggga catgttctac aacttcgtgc 240
aaattaaaaa caacacattt ttgaggagga cagtagagta tgctgggcaa actaaataaa 300
taaaaataaa taaaccaaag tccactgc 328

<210> 877
<211> 404
<212> DNA
<213> Homo sapiens

<400> 877
acaccaacca aatgctgtct ttgaatgtac ctactgacat tctcaccaga aatatagaaa 60
tcatctgttt tcccacaacc actccaaaaa gactctacac atactggatt taccactgtt 120
cagggaaaaa gcaagatcat ctcagcatgt ggagcaagac ctgtgatgcc atcttcttgg 180
accatctcat tttttagttt acttttcgcc atttttatag agaaaacctg agttggctag 240
tggcagaatg gttggagctg ataactgcaa agagtacatg tgaaatgcta atatccatgc 300
ctctgaaaca ggatcattac acagagggtt ggggaactcc agttattaag tatatgtaac 360
tcccattcct taataatgat atttttaata aactcttttt tctg 404

<210> 878
<211> 450
<212> DNA
<213> Homo sapiens

<400> 878
gtggatgatc aagagccctc atctggaatt agacctatct tgcttgttca gatccctgaa 60
ggagaaaaga actgctggta tcccaacctc aacgcagcaa gtttatttta tgtgttttac 120
atgatgtcct gatccaaaag ctggtttttt aacaacaaga ttcacaagac gaaaaaatat 180
tttaaaaata tggattgact gcttggagaa aatttaaaat cttttgagca gcactgactt 240
tgaagtggaa ggatataagc agtgggagct gaagttattc agatacacag agcaaggcct 300
tcggacgaga gctttgatga gtcctgaagc aactgaagtc atgaatacgc ataagctata 360

acttacaagg caagctattt gggacagaag ataaggcatc cacttcttag gaaaaatgag 420
ctacgcgctc tacggtgtct ggggtcacat 450

<210> 879
<211> 458
<212> DNA
<213> Homo sapiens

<400> 879
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aactaaaaga ggaagtggcc tataggagaa aatgaaatat gattgtccct tcagtgggac 120
atcatttgtg gtcttctctc tctttttgat ctgtgcaatg gctggagatg tagtctacgc 180
tgacatcaaa actgttcgga cttccccgtt agaactcgcg tttccacttc agagatctgt 240
ttctttcaac ttttctactg tccataaatc atgtcctgcc aaagactgga aggtgcataa 300
gggaaaatgt tactggattg ctgaaactaa gaaatcttgg aacaaaagtc aaaatgactg 360
ggccataaac aattcatatc tcatggngat tcaagacatt actgctatgg tgagatttaa 420
catttagagg tgacagcatc ccccacactg gcagtgtc 458

<210> 880
<211> 274
<212> DNA
<213> Homo sapiens

<400> 880
aatgacccca cctggactcc tgcctcaaga cttaacatcc tgtggcccta tgcagaggca 60
gactcatcac accaggactg tttttcacac tccaatcatt ttttttccct gaccaatcaa 120
cattccccat tccctagtcc cccacccatc aaactatcct tgaaaaccct aaactccaag 180
cctttgggga aatacatcaa tttgaataat aactctgtct catgcatggc atggccagcc 240
tcctgtcaat taaactcttc ctttactgca atgt 274

<210> 881
<211> 265
<212> DNA
<213> Homo sapiens

<400> 881
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tcaatgggta atcacaaaga agaacggggc agagctagag aacagagaga acgctttttg 120
tgactcaagt gtgcagaagg taatcaactc ttcctaagga tcagatgatg ccacttggcc 180
ctacaatgtg atatcttcag tttcctacat tcagtaaaac ttttcaagac tcagcctcat 240
ataatagaat gttactcaac atttg 265

<210> 882
<211> 278
<212> DNA
<213> Homo sapiens

<400> 882
tctctgcacc ctacaataca ccaactggca gttccatcat ttgaaagaaa atcttcaagg 60
taaagacatt tacaatgaca caaaaacctt tcaaaggcat catggtccta aagggctttc 120
cccaagggac agcacagtgt gttccaggcc ctgacaagag gtttaagacc tgtgacacag 180
actgaagctc tcctggcata ctctgaagct ctcctggcac cctccccttt atgcttcaca 240
ggtgtttctc ctaataaatt tcttgtatgt ctcatccc 278

<210> 883
<211> 312
<212> DNA
<213> Homo sapiens

<400> 883
gttttcccga ggatgactct ggctgccctg acagccccac cacaggggac agcagcattt 60
atttgacttg actaggattg gaacttccag tgatctacaa tctccatatg atctctgttt 120
ctacaaggaa gcaccttctc catgaatatt atgcacttag ttaaactgag ccatggaaag 180
ccaatcattc attcaacaaa tatgtacaga gtgtcaataa tgtaccaggc aagaaacaag 240
gagctgcgct ctttcttcaa ggaatccata gttctatcag tagaaggaat aaaatattct 300
aagtgtcttt gt 312

<210> 884
<211> 123
<212> DNA
<213> Homo sapiens

<400> 884
ctgtatcaaa tctggattgc aagctggcct tctgattgaa gacgtcagga atgacacaca 60
acagcctacc atcctcattt ccactgctct gctgaccagc ctaaataaat aactttaatt 120
ttg 123

<210> 885
<211> 450
<212> DNA
<213> Homo sapiens

<400> 885
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accaagacag aagggaaatc agggatcgtg tctgcagccg aagaaagaag atgcaggcga 120
tagaggaggt ggagaaggag tagctgcccc ctctttccta cctgatcatc agaggggaag 180
aagccaagac tcaaggagtt aagaactttt ccaagggtag ctattagcca ggactcaaac 240
ctacatactt gaatgaattt ctacaacctg ttattgaaga ctaaggaggc ttctcagcct 300
gggctggatc ctggacagac aggcccaggc aggctgtgca ctgtgacctg gggccttgct 360
tgtgaacaaa gaggacttca agaggagatg gcctggagga gttcgccttt gtggtcattt 420
tgcttcagtc cgtgacaacc tggcttctgc 450

<210> 886
<211> 478

<212> DNA
<213> Homo sapiens

<400> 886
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ccatgctgaa cactgtacct ggcttagtaa gttttgctaa attcatggat gaatgaatga 120
aatgtgaaga agctccggat gatgccaagt tgcaagggaa agccaagaac tgaggggaac 180
ttttgggagg catgaaatgg aagaccaaaa aagccactct gcctccatgt actcttcgaa 240
ctttccaana ataccatgct cttcttgagg actttgcnc caanacaggt ntttctttan 300
anngggcncg ggggccaatc ctggnnaatt tcttgggcct tggggttgna aaaaagncct 360
nccttgggaa gccggcccca aaaaancttc cggttgggga angggaaatn cccttttnc 420
caaaggggtg ggccgggacn cctttccttt ngggggaat ttttttccc taaaaccc 478

<210> 887
<211> 616
<212> DNA
<213> Homo sapiens

<400> 887
tccttcctct ctgaagccag gatgaaataa cgttgcgatg taatacaaca aaccatatac 60
ttccaagttg aaatgacagt aaaatggtgt gatcttggct cactgcagcc ttcacctcct 120
ggactcaagc aatcctctca cctcaggctc ctgacacacc agttgcacat tcaggtgaaa 180
attcaggaag aaaagaagcc gtctacatcg cggtggatgc cttggcttat gaaaactttg 240
tgggttcttg gtctcgctga cttcaagaat gaagccgtgg accttcacgg ctggctgaga 300
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taaaagaata taccaagccc tattaattat tcagaatata ggagtgatgt ccttcttctc 420
aaagcacata tagttcacat ccccaggctt aaattattat tattgctatg ntggagctgg 480
gtttaaaagt tcgtgaggag tgattggtaa aatttcanga attgngcaag ncagttggta 540
acacaaccct tatgtaatta tagaaactta caattaaata aattatggta aaaaccaang 600
cataaatctc taactc 616

<210> 888
<211> 427
<212> DNA
<213> Homo sapiens

<400> 888
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aactgttcca ggggtagcac ttagagagca ggacatgccc ataagcttga ggaaggtact 120
gcttacaaga aatgagtcac agcaactcca ttgcttccaa caacaaagtg gatgaaaaac 180
actcaagccc cactaaacaa tactcggagt tttgctgcga cagactggtt agactatttg 240
gacactacca tgaagactat atccaccatt ctgccttcaa aggaggagac tgcagagaga 300
aaaggggaag aggaacagga ggaaaaaggg ggaggggagg aagtggagga ggggaanaan 360
gncntnntnn angaaganat ntnnntttat tgccatanaa atgacngnnn gaatccattt 420
tttcctg 427

<210> 889

<211> 572
<212> DNA
<213> Homo sapiens

<400> 889
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cggagacgtc tctcatagca ggaaattcca ggtgagggca gcaggatttt ggtgaattgc 120
ctggttgtgc caccaaggac tcctgctctt ctcatcttcc caggcggcca ccccagggtg 180
aagatgctct tccggccacc ttctcttata agtgcaaagg gctgcggagc accaggcatt 240
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ctgtaggagt gagaaaacct ttgccagaca acccccagca ggcttcctgt tgggactcat 360
tgacttgagc ttgtttgaag ccaattgttg gaaagagaaa tggagttacc aagattttct 420
caagagacag agtttaccct tagccacaca aagtggatac ctgaaccagc aaggatagag 480
agggcatggc tgctgcattg tcaaccaaca gtattcacaa cagaatgaaa aacaattcac 540
atttactact gaataaagca gacactcctg ac 572

<210> 890
<211> 622
<212> DNA
<213> Homo sapiens

<400> 890
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gattatttga acccaggcac tctggcacat gctttatgag attcatttct ttgcaccctc 120
agttaaggaa agacactacc attcaaatag acaagctaca taagacagac tacgtataca 180
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gtttagacag ctctgctacc tataaacatt tgctctaatc aattagagaa ggagagccta 300
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ttaactggga taaagaggac atttctccat tcaagagctg cttctgattg ntctatgttt 420
ctgatgcatt tttactgacg caatacatag ggtaataaga tactcatgtt acagacacat 480
tatgtaataa gtctgnatcg gttatatcct tatttggttt cangaaaatc aaggtttatt 540
tttacttctg ngaaacaatg ncatttcaac ttatttatac atattccttt atcaaggaaa 600
taattttatc ctggatatcc cc 622

<210> 891
<211> 235
<212> DNA
<213> Homo sapiens

<400> 891
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cttccacagc gccatcctgc tttgctttct tcccagcacg tacctttgga atgatccgat 120
ttctcactaa ctgtcctggc ccccttgaat ggatggccca gagagacaag gcctccttca 180
cagcggatgc tcagaattta actaaatgat ttaacganta aatttaggta aaact 235

<210> 892
<211> 231

<212> DNA
<213> Homo sapiens

<400> 892
caagactgcc tttctggccc tcgttccttc ttcctgtctg ggactctagt gaacatcatc 60
tacgaaaggt tctgatcaga aaaggcattt tcagagctga cactggctgt tgaaagaaaa 120
gaataaaaag cttgagactt tcagcatcct ggagaaagaa tatgcttcat ctacgcacct 180
cacacatatc tgacttgaaa tcagattaat aaatataata cttccacaag c 231

<210> 893
<211> 213
<212> DNA
<213> Homo sapiens

<400> 893
atccagtaaa gactgcgcgt ctgacacctt taaaagtctc aaaaggaaac atttaccatc 60
tgttctttct gagggaggct tcatctatat aacaagaaga ccacctttgc tagccaagcc 120
accttttttc ccccttccca caaactgttt taccagaatc caagcccccca ttctttctgt 180
aacctctaaa tggtatataa atttctgtaa ctc 213

<210> 894
<211> 138
<212> DNA
<213> Homo sapiens

<400> 894
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tcgtcaatgg acagcaccaa cagtttgcac tctaaaattt tttgaatgcc tctcattaaa 120
atcctcctct tgctgctt 138

<210> 895
<211> 219
<212> DNA
<213> Homo sapiens

<400> 895
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ccatgtgaaa agagacccac cactggggat gagtgagcta gtgaaacgct gctgcagaat 120
gaggtacggc tgagacagcg gtgaaccatg gacaggaggg aggtacacgt gaatagacgt 180
ttatgtgttt tatgctaaaa taaaatgtat aatgattgc 219

<210> 896
<211> 453
<212> DNA
<213> Homo sapiens

<400> 896

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agtagtcttc attggaagtc acctttgaaa acagaacgtc acttttgttt agcactgcaa 180
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aaccaattaa ttagccccct gtggctgagt tcttaaactc tagaaggggt acagagagat 300
cctacctacc ctatggatgg cagaaatggc agctgacatg agtttcactt cctcatttat 360
aaaatagagg atactaacag gcccatcttc aaaggctgtt gtaaagatta aatgagttaa 420
tatatgcaaa taaactggaa cagtgcccat gac 453

<210> 897
<211> 184
<212> DNA
<213> Homo sapiens

<400> 897
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gtctaatcac tttgaagatg aaaagttgct gtgaaatgcc aaccgagctg atgggaccag 120
ggctggagca gagatgaaga gacacagcag ggccaattgt gcaaaaataa aatgcatatt 180
tttt 184

<210> 898
<211> 90
<212> DNA
<213> Homo sapiens

<400> 898
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atatttcaaa taaactttcc tattaaagag 90

<210> 899
<211> 452
<212> DNA
<213> Homo sapiens

<400> 899
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ctccatcacc ttcagatgac tgcagccctg gatcacaact tcaccacaac cttgagagtg 120
accctcacct tgaacctccc agccaagctg ttctcagaag gccagctaac ttccaaaatt 180
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tatgtctcgg ttatacttga gtgacgctca tatactttta ccccattttg tatctctcag 420
ttatacttga ataacgctca tatacttttc cc 452

<210> 900
<211> 636
<212> DNA

<213> Homo sapiens

<400> 900
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cccattcctt ctgtggagtc tgatcttcca aactttagac aacagctcct tctgcaagct 180
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tactgtactt gcccacacac acttttcttt aaagattgca tctgtctaga tgtgtggttc 360
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gcagtctgca gcttgatcta gactctatcc accagagaca tgcacaattc caaattctat 540
atccaacaca atattttacc cagtcttccc agaaaattca gttatgccat atggngactc 600
cactcctgaa taatatttaa gcaacttgat gaacaa 636

<210> 901
<211> 477
<212> DNA
<213> Homo sapiens

<400> 901
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acagtcattc cctggcagga aggttcccaa ccctgggtgc attgcaccat catccgtgaa 360
agatcatttt attttaaaat cagattcttg gttacaccct agccctacat aattaggatc 420
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<210> 902
<211> 294
<212> DNA
<213> Homo sapiens

<400> 902
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tcctactggc actgtgatga ctagtgcaaa cctacgctat ctacaatgcc ttccctgtct 120
tgcggctcat tctttctgaa gccagaacac ttagagtggg tggggatagt agggagaacc 180
accatgctgc aatagcaaac cagctccaga gaagggtctt caaggggtgc taataatact 240
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<210> 903
<211> 433
<212> DNA
<213> Homo sapiens

<400> 903
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ctcacagaga ggctcacggt aaacctccta gagcatctta ttaaaagaga aacgctacag 120
ccatagtcac agatgagctc tggtgactaa aatcccacct accactactt gactgttgcg 180
gtccctgaag cctacaaaat cgcagaatga ttgctggttc tcaaacctct aggttacttt 240
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gagacttagc ttcaatatca agtaatgaag cctttcttaa gtacctagag aaaatcagtt 360
ttccggtctc tcatgctacc tttgtacgca cagctttctg ttgttacctt ttcaaatcaa 420
tcatttcacc att 433

<210> 904
<211> 437
<212> DNA
<213> Homo sapiens

<400> 904
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ctgtcttggg ctgtggcccc caaagggctg tgcccaagga gaagcagtgt tccaatgcca 120
ggggtgcagg cagtggcagc tactgccatg attgtgggtc tgctgatttt cccaatcggc 180
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cccatcatca gctggcccca cacaaccaag gtccaaggga ggaccatcat cttctccagt 360
gccaccgaga gaatcatctt tgtgccagaa atgaacaaat aaaaatctcc tgggagtagc 420
acaaagggca caagtga 437

<210> 905
<211> 237
<212> DNA
<213> Homo sapiens

<400> 905
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ggaatgctgg aagttactga aggagaggaa agcatgtaga atccctggat ccaaggcaaa 120
ggaagaaagc actagaattc aacttgggtc tgcaaaaatg aaccacagga agacctagac 180
aggctttggc atcgctatca tggtaacctt tgctactcat aaacaacaat tcacaag 237

<210> 906
<211> 633
<212> DNA
<213> Homo sapiens

<400> 906
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aacatacaac tgtgatgcag tggactgaca gaaggaccag ggaaatgggg ctgctctttg 180
ggatgcgaat ggtgacatct tcaggagaca acatctggtc tgagacttga ttgaaaagaa 240
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attctgagtg cagtggaagc cccttggggg ttttcagcag gacaggcagt ggcatgaaag 480
cagaactgag agagctgggg ttacctccac tgggtttatt ctctttccac attctctgga 540
agacactcca ctttctttct ttaaaactgn aattnccctt ggttgacttt aataaccanc 600
caagaacatt ttttcagctg gttaaatttt ttt 633

<210> 907
<211> 647
<212> DNA
<213> Homo sapiens

<400> 907
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ggcagcgaca gcacaagctc acgatcccct ccatccagta cacggagcaa tgtcacctgg 240
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acccaggaga cgagatcatt ttccagatgg acaaagtgtg ccccatccgg cagccgggag 480
gctactactc tgactggaag gtcttttctc cgaatctggc tcttgctccg gtcccanggc 540
ccctggaaaa cgcccaaaga aaagcaagaa aatgcgcttt taaggagttg aggaatttac 600
cangaagctt gaangggga anggncccag ggcttgaagc aaacaca 647

<210> 908
<211> 298
<212> DNA
<213> Homo sapiens

<400> 908
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gcagcaaccc acgtagccgc tgggccctgg attaggaccc ccagtctggc agtgcttatc 120
tgcccgtctg agtgatggag agatgagtat cagtctatac ctcaactgct tcaagcccgc 180
ctgggctttc tccctggcgc ctttgtctgt gtcagggttg gagcaacgaa actgaaagat 240
ctccagagtt tgaaaacaga gtgaaagagc aaatttaata aatgagagct cagcctcg 298

<210> 909
<211> 197
<212> DNA
<213> Homo sapiens

<400> 909
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cttgnctgat gtactgtnga gcagcagnac tatcttgttc tgctanaact atcaaaagta 120
tatgaaaatc tcctttgaaa actcagaatg taagaaacat cactgaaatc ttcaattata 180
aatcttttgg gaagctg 197

<210> 910
<211> 645
<212> DNA
<213> Homo sapiens

<400> 910
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ctccttgtcc tgaggccact tggtggccat ctccatccaa tgttgtctgt ggacccaac 120
agagggctga gcagctgtcc gtccttgact ctgggagaaa ggcgttatca tcaagatttc 180
cataagtgga cagaagacac actgaccatg aaaggaaggc cagcactggg tgatcatttt 240
cattctaaat ggaatctcat caaataagca aagaagatta agcgcagaga aaagacaatg 300
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ttacctggga gattttacct atgtaagaag acaacctttg ctcactgngg agttctgtcc 420
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gcccttntt tgagtttcat attttggatg ggtccggaaa cactt 645

<210> 911
<211> 639
<212> DNA
<213> Homo sapiens

<400> 911
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gagagccggg aagggtgcaa agtggcatgt cctttaccag tcactctttc tgggccaatg 180
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gtaggagaga caggattcaa tctgtcagcc cacttntgcc ggtggccgng tcccttgttt 600
tgggatcctg acaggcagnc cccanccagg aacccgtc 639

<210> 912
<211> 629
<212> DNA
<213> Homo sapiens

<400> 912
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tccaaatgga aggaaccaca gcatgtgggt aagaaacttg gatctgacag cagaagaaga 180
aagaggatat tgtatgcctt caatcagctt tgtattagga gagccttaaa ggaaaaattt 240
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tggagaaaat gactgatttg ggttggtcat gttgccagaa cagatgactc aaggcttcca 360
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atgattgact gtaaggcttc aaaatcaact gtaccaaaga tgagcttgaa tcattgccca 480
gaacagagct gaatggggat gttccattgg gttctggctg ntgaaacaaa ataaaatgta 540
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ggctgacttg ctcaaaaggg ggggggggg 629

<210> 913
<211> 644
<212> DNA
<213> Homo sapiens

<400> 913
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agacacccag tgagtcttaa gtgcctctga gaaggtagag ttgaagaggg agcaaacaaa 120
attaagagat caaccctgca atccagaaac tcagctgatg gccagtgtta catagagcca 180
agatttaagt gccactttgc ttctcttcca gtaaacaaga cagataacca actcatgagt 240
tgctccattt tgcatttcta ccagcaatgt gactactctc ccctaccttc atcaacacaa 300
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tgatacctga caccctcgga actgacgtct gcactgagag cacatctccc aactgcagag 420
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taattggtgc tattgaaaat gcttatgggt cattattaaa catg 644

<210> 914
<211> 634
<212> DNA
<213> Homo sapiens

<400> 914
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cccaaagccg gcaatcctat gtatctcctt tcttgctggc ctatcatagg acaggtgtgt 120
ttcttacaga tacaacaaag ctttaaagca cgaaaaagat gaactcgaaa caccagtgac 180
tggaggaacc atgacaacac aaacaagaag gaaacaagaa agaaaaagca taatcctggt 240
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ccccctcgag tggcttatct ttgcagacaa ccaa 634

<210> 915
<211> 553
<212> DNA
<213> Homo sapiens

<400> 915
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caactgggcg gccctgcttc cctgcctcaa cccagggctg tgtgcttccc agcaggcact 120
gccatctatc cagccccaca gtttcccagc actcagcact tctgatgctt ggcctcaacc 180
tcgccaccac tggagaagat gaaggtgcat tctggtggct tccacaggta tgacactgtt 240
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ttctgttagc aggcaaggaa cttcctatgg ntaatctgct tgatttgggg gggagagtgt 540
aatctttaaa aag 553

<210> 916
<211> 167
<212> DNA
<213> Homo sapiens

<400> 916
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gaaatctgga aagctttaca gcatgaaaga agaatggttt cattggataa taatccatct 120
gcaataagag caaagtccat actactatta aatgtgttta tccactg 167

<210> 917
<211> 184
<212> DNA
<213> Homo sapiens

<400> 917
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agaagattgg aacactgctc agccttccca accttctttt accactgatg tttctacctt 120
agtgatcttc ctccttattt taatgcttct ttctctttac aattaaaagt tcataaaatc 180
tttc 184

<210> 918
<211> 441
<212> DNA
<213> Homo sapiens

<400> 918
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ctttgcctgt tggtcaccgc atctccaggg aactcagagg catctccagg aaacacctga 120
atatgtgagc tggttcctta caacagtcca atgaagcana ggngtgagca gatccttttt 180
acagctaang aaactgaggc acaaagaggt tgacagcaca cttgccccaa agcgcagatc 240
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tggagtcatc tgaaaggcct tttcacttnt tgtgtctggg anggcaattg gccccttgcca 360
gctnggactt ttccacgtgg ctccatgggt gcctcacaac atggncctgg gtcccaagaa 420
gacgagatag aacattttta g 441

<210> 919
<211> 325
<212> DNA
<213> Homo sapiens

<400> 919
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catgtagcaa ggacataagg gtggctggtg gcccagacag aaaggagctg aggctctcgg 120
cccaacagcc tgaaaagaac tgaagttaca cccacaatga catgactttg gaagcagatc 180
cctgagtctt cagatgagac ctcagaactg gccaacacct tgattgaagc cctaatgaga 240
gaccctgaag tagagggccc tcctaagcca tgcctggatc cgtgactcat aggaactgtg 300
aggtaataaa tgtgtgctgg ttgct 325

<210> 920
<211> 508
<212> DNA
<213> Homo sapiens

<400> 920
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ctgggaagat taagcatctg tcatacctac ctccccttca gaggtttggc accaattggt 120
acaatgaatg agaaaagggg agagatggat atgccgaggt acattcatgg caaatgaaga 180
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agaaccaaca tcactgcagc cagtacccca ttgcattaca agcagtgact gcatttcagc 360
aaaataacaa catacatcat attcaattaa gtgtggnaaa tttgtatttt tatttgggtt 420
actgaattta aatctcatct gcaaaacaat tttaatggnt ntttngaaag gaaggggntt 480
atataaagtt tatgttggaa atcctaaa 508

<210> 921
<211> 370
<212> DNA
<213> Homo sapiens

<400> 921
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tggacatcaa ggtcgcagcc agccttcagc aagatctgga ccacaggaag atggccctta 120
ttggcagcaa gatgcagggg agtccggcca tgctgtgaat gcaaaatgaa caatgatttc 180
ggaacaagtc ctcaatgcta ctcccttggg agacagaggg cctagagcaa ggtttgcaca 240
ggggctttcg gatgatcact ccctcctgcc cctttggatt ggcaggagat tcttatgggt 300
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cgatatgttc 370

<210> 922
<211> 515
<212> DNA
<213> Homo sapiens

<400> 922
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cactggccaa gacaatgaag gaatagaaaa gacttacggt atagacaatt aatctagctg 120
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ggcagcaaga ttccagaaga gaggactgta tggtcatccc agcaaaccag gccttaacag 420
cgtcattaca tttcccacgc tgcangggaa ggaaattttn acattnccna aaggggccca 480
aacntancag agcacctnct aaatttatag aagga 515

<210> 923
<211> 273
<212> DNA
<213> Homo sapiens

<400> 923
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gtcaagatcc acaaactttc tcagaaatct ccaacagact tctacatatg tctcattgac 120
caaaaatatc tcatatgttc atccctagct gctcatggcc ctttgaataa aaccaaggat 180
ctattgacaa agactgggag agtagatatt tgcaatatta gcagtgtcta ccacaccaac 240
ttccagtcat tcaactaagg tcttttctgc cat 273

<210> 924
<211> 521
<212> DNA
<213> Homo sapiens

<400> 924
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gaactgatgg atcagacttg gccttcaacc tcctgttatc ctgatgaaat tgcaagctcc 120
aaacaacaga gacacaacat tgaccaacag taagatggct tgaagaaata tttctttcag 180
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acctttacac agaagcacag agctncncaa gaaaaggggt ttnnnggaag ggaaaatttc 480
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<210> 925
<211> 512
<212> DNA
<213> Homo sapiens

<400> 925
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tggcaccagc ctgtctatgg tctatgtggg aatcaccgcc atccttgcca ttccatgcag 120

tgtaccatgt gatgggctgc attacttagt gacaatgcta ccttctcact ccttgcacag 180
aggagagaca gacacctgct tgctccaggg cctgcctgag ctcaggctct gccacaggga 240
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gtttgatgtt cacagagagg agtgaataca aagcatggct ttaggcagac ttcctttaaa 420
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gnggtntttc cctgccctgt acaaagttta tt 512

<210> 926
<211> 440
<212> DNA
<213> Homo sapiens

<400> 926
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gtggagccct gaggcatcgt tcaaaaaagg acaaacagcc tgagaggcag ataaatggat 120
ggcctggtgt aattttaaat cacatgaatg atgttgcttc tctctcttcc cctggagaac 180
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aatatattac catgcataaa catggnggga ggtcaaaaag ggccncnctt tgggcaagat 360
ttttataaaa taagctgagg ctcaattcat ttttctcaaa acgctggagg cccctgccct 420
tgccaagccc aagatccttt 440

<210> 927
<211> 530
<212> DNA
<213> Homo sapiens

<400> 927
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ctctggatac taaggtgtct taatggaatg tggatgatgg ggtgtgtgaa gtgcattcta 120
cctgcgtgga gacatctcta atggctgcag atgaagtcct gcctccctgg ctattctcca 180
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atgacacgtg acctggnggg gnctcaccca aggcataccc ctttncaagt tagnaaaana 480
aaaaaccntg gtcacagggg tttatagttg gttatgggcc gctcacaaac 530

<210> 928
<211> 530
<212> DNA
<213> Homo sapiens

<400> 928
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ctcaatcact ctgcaaatga cattacaacc ggaataaatg caaaggcagc aggtctcttt 120

aggacataca cctacacaca gtgccaaact catcctgtgg ccaacagatg tacagagaat 180
cccagagtgc tttattaagg atgggtgact gttcatagtt ggcatagttg gtttcctaaa 240
cctgggaagc tcagcaaacc agttttacaa aaacatcaat agatgatgat ggtggtgatg 300
atcttgataa cagtgttaat gattatatca gaaactagta cttctgaggg tttacaaggt 360
ggcaggcact gaggcaacat cttcctatac cttctctcat gtgattcttc caagcatccc 420
atcagaagct ggccaanggg ggtcatgtct gtnatcncac acntttggag gccaaaacaa 480
aaggatcgnt tgaagtcagg agtttganac cagcctggca acacagaata 530

<210> 929
<211> 518
<212> DNA
<213> Homo sapiens

<400> 929
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acaaagacag atacacaagg agaccatgat gaggcagaag caagagatca cagtgatgct 180
tctatgagcc aagaaaatct aagaactgcc agccatcacc agaagctaaa agagaagcct 240
gaaacaaatt ctgcctcaga gcctccagga ggaatcatcc cgggagacat cttgatatca 300
gatttccagc ctccaaaact gtgaggcaac aaataatctg tcattttaag ccaccagttt 360
gtagtcactt gttccagcag ccctaggaag ctaacacaca gtcagcctcc attttttgat 420
gnttgaccac acacanggtt gaaccctncc gnntncggct tcttcttatt ttgaccnggg 480
aaagtngata accatgtggn ggggctccct ccttgggg 518

<210> 930
<211> 495
<212> DNA
<213> Homo sapiens

<400> 930
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tagcagatcc agaaatgatt agaacactta ggataatgaa ttattacatt ttcaaggcac 120
atcagtgaat gttatgaaga gggagaagaa taaagacatt gttgaactta gactttgaca 180
agatgcatat tggatatcta aatagagata tcaagaaatg aagatatgca tttccagttc 240
cagagagaaa ttcacactgg aaatataaat ttaggaattt taaagttagt ggtcacattt 300
aaagctgcag aatacaaaga gatcacctgt gtgagagaac tgagtcctga aacatacccg 360
tgtttaaaga tctgggaggn gcagaggaat ttcaaaggag gctgagaagg ancancngtg 420
aggngggtga aaaccagata gcnaaagaaa gcngaatttg gactgacttc ctttgnaaaa 480
attaaaaatg taagg 495

<210> 931
<211> 410
<212> DNA
<213> Homo sapiens

<400> 931
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tccagngggt cctctgatgg nccccaatgc tggaagtcac ccatatagnt ctgaaaagtt 120
gtcacaanaa atggccgttt ntggaggatg cncaggaaac ttttcatttg gcatgaaaaa 180
ggctnttggn tttgcaaaga cttgcagaag gaagaagttt aaattnttga gccctcaaaa 240
cagattttta gaaaagtgtc ttccaacctt tgtttngtcc aaataaagga agattnngac 300
ccncnaaaaa aatgtanaan aattaanant aaaaattnng gggggngggg ggggggcctt 360
tttttgtgn ntntntnccc gngngttttt ttttttaaag gggggggggc 410

<210> 932
<211> 510
<212> DNA
<213> Homo sapiens

<400> 932
cctatggaag taattatgga ttaactttgc ctgatatttc caatgaattc tccatagcat 60
caagcacaaa tgatgatctc ctaggacagt ggcagcttct gagaatgcac aggaaagtga 120
ccagggaaag aatgattcca tctccaggaa tccctggtga tcttcagagc ccagacagga 180
ccctgctggg ccatggtaac tgagaaactg agaagcagat acagtggtcc ctatgttggc 240
aacctcagct gaagaggaac aactctctct ataatcaagg acttctgaaa ccagaaatta 300
ccagcgtggg gagagaacat taaaggcaga ggtgtctctt ataagcacaa cgtgtgacca 360
ggtaatactg tctggattag cagctgtaca gcctaactaa gccctggagc tacaattatc 420
tggtcgcatt aaactgaaat cacctgaaaa acttncactg aacaaaccct ttggaaagtg 480
ttnaatggcn cnttcacccc caaaagggaa 510

<210> 933
<211> 631
<212> DNA
<213> Homo sapiens

<400> 933
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tcgaataagc ttttgatgaa gcccgccaca tgggantcgg ccccttgaac caaagaatgg 120
aattgcaccg caaagttctc ccggcccgct ttggggtggg agangnctat tccgggctat 180
gaactgggcc acaacangac aaatcggctt gcttctgatg cccgcccgtn gttcccgggc 240
ttgtcaacgc aaagggccgc cccgggttct tttttgtcaa agaacccgaa ccttgtcccg 300
gttgcccctt gaaatggaaa cttgcaagga acgaaggcaa gccgccgggc ttatcngtgg 360
gcttggccca cngaacgggg gccgtttnct ttgcgccanc ttgttgcctc cgacggtttg 420
tccaacttgg aaagccgggg aaaaggggaa cttgggcctt gnntatttgg ggccgaaann 480
ngcccngggg gcaaggaatt cttncttggt cattctttaa cccttggctt ncttggncgg 540
aagaaaaagn aatcccaatn caatnggctt gaanggccaa naggcngggg ggcttggant 600
aaccctttna nnacccgggt aaaactcgtg g 631

<210> 934
<211> 503
<212> DNA
<213> Homo sapiens

<400> 934

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ataactaatg actgatgggg tggtgggttc tttcttattg catgaatcct taaaaacaga 180
aaattgttcc tgggcgtagt cacagatcga tgtgaagata gaagacagca ccagaatcaa 240
tgaactctgc aaagatcctg gactccttct cctgctgcat aataaaggaa gtgaaattct 300
gcttcatcga tgaataacag gattttatat aaaactttga atgacatagg agggacaatt 360
tgcatagaac aacaagtcct caaactggcc acaagctgtc tgcactgttn ttttgaggat 420
ttccaaaatg ccanaangng cactaacagc tntagatact tgagtcnaca anaaacctnt 480
gnncnttttt tttttaaggg gtt 503

<210> 935
<211> 155
<212> DNA
<213> Homo sapiens

<400> 935
tggaccagag tgacctccca ccttcaagga ctcctgatca ctttaccttg attgtctaca 60
agggaatgat ttacaaatcc tacactatga ccatcctcaa gaggcctcat taagaaaagc 120
ttctcctgta ttaaatccaa agctgttttc attgt 155

<210> 936
<211> 535
<212> DNA
<213> Homo sapiens

<400> 936
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tcccagcagg attcctcctg gtgggggcca agtctcccaa tctgcctgaa cacatcctag 120
tttgtgctgt ggacaagcga tttctaccag atgatcatgg aaaaaatgca cttttagggt 180
tttctggaaa ttgtatcggc tgtggagaaa gaggatttcg atatttcacg gaattttcca 240
accacattaa cttgaagctc accactcagc caaagaagca gaagcactta aagtactacc 300
tagtcagaag ctcccagggt gtactgtcta aaggacctct tatctgctgg aaagaatgta 360
gaagccgaca atcctctgct tcttgccact ctattaagcc aagctcttca gtgtcgtcaa 420
ctgtgacccc agaaaatggg acaactaatg gntacnaatc agganttctn ttaaagggac 480
cccccncttt gcccnnggnn gggnngttaa aaaaacaaat ttgttggggg gggtt 535

<210> 937
<211> 488
<212> DNA
<213> Homo sapiens

<400> 937
gcttttggtt ttggaccatg agaatggctt acatattcaa aaggttggat ttgggaagca 60
atgctaagca gtggaatgga catcgacata gagagatcag ctccacactt atactctgcc 120
actcaacttc cccatgtgac ttgaggatca ctctaactcc aaaacatagc aagctcgcgg 180
aacatcaggg ttcatgcaaa gtattccaag gagccccttg aagcaacaga atggattgct 240
cttctatggt ggaatggcac cctggatgat taaaaccgta gcagcaaaca aaacctccat 300

caagtaagaa ttcagagtgt gagatatcac gcacagccac gcgtggatct ttatatacgt 360
gtcaatgtgt ttgattgtat ttttgctttc aaagtatgta ttgagcattt cttctaggtc 420
ctcaagtaac atcttttttt aaaaaaaata aatgcttaag ggaattgntt tatattaaac 480
tcgctttc 488

<210> 938
<211> 482
<212> DNA
<213> Homo sapiens

<400> 938
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caagcaagca ctctcaagcc cgctctgtct gggagctctg tgttttcaga gcctgttgtt 120
gcagcgatgc ctggaatcct tgacacctgc acaccagctt cctgggcatt tccacaccct 180
ccccctcccc acctcctgca tctcccattt gcatctgaaa tgcagctgct ctgggcccta 240
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cgaatctgaa gctcctctgt gcgacgcctt tgttgcctcc tcattatgtt taaatgagcc 360
tcatctgcag gaggattttt ttttaataaa ataaaataaa accaccacaa aaaaaaaagg 420
ccagngnggc caattnagct tggacttaac caggcngaan tttttnaaaa aggggggggg 480
cc 482

<210> 939
<211> 525
<212> DNA
<213> Homo sapiens

<400> 939
caggaagccc tgaagatgcg gcaagctgtt ctctactttc ttgctgaatg agcaaatgct 60
ctaaagagaa gtaacagaag aaaaagatgg ttgtgccatt gaccaggtgc cgttctcgtt 120
gcccattcat ttcctgcccg ccctgcacac atcctgcccc taggaagcct gctcctgaaa 180
caagtctcta cccgcaagaa gggtctcatg aggtgccagc ctcacgatct tggacttccc 240
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ttttccacgt ggacctgggc tttctcaaac atggtgtctg tgttccaaag atcagaaggg 360
ggtgactgaa gtagaagcga agtcagcaac ttatcttcag gcataactac ttttcctgta 420
tcctgaaccc tcgagagggg atttcttgaa gaaaagaaaa gaaaaaaatt cccccttntt 480
ccctgggang nggaanaggg tgggaaaaaa aaaagggctt taaaa 525

<210> 940
<211> 160
<212> DNA
<213> Homo sapiens

<400> 940
gacatcaaac ttcctggtcc tcatgccttt agcctcagac tgaatgacac caccagcttt 60
cctgcttctt cagcttatgg acagcaccgt cgtgggactc ctcagcctcc agaattgtgt 120
aagaaaagtt ctcataataa acctctgctg gtatctcttt 160

<210> 941
<211> 122
<212> DNA
<213> Homo sapiens

<400> 941
ggaaactgag accacatggt gaagaatctg tttggcgaaa gggctggaag attccggggc 60
tgtgcctgca atgagggata tacaacagtt ctccctatgc ctggaacaga gaacctcctc 120
tc 122

<210> 942
<211> 304
<212> DNA
<213> Homo sapiens

<400> 942
gatatgacat cttaggaaga agggactggg ggaaagaaag cactttctgc ttctgtggat 60
ataaacacac agtgttttat tccctagtgc aacaaaaccc caagatcaac agacaagagc 120
tgaaaaccct ttcccaccag acacagtgcc atctaaatgt tctctcaaaa gatagcatct 180
cataaacaat ttcaacaaaa ggatgtcagc ttttacttta tgtgcatgca caaaatcact 240
tttcaggaaa aaaaatgacc attaccgaat ccatcataaa attaattaca tttagttgat 300
cacg 304

<210> 943
<211> 155
<212> DNA
<213> Homo sapiens

<400> 943
atggcagaga tggcaagcac aaagaaatga gattcacgct attccatttg catggatgaa 60
aatacagaca ctttctaagt gaagtagaaa ttctctgaca attaacaaga agagtttctg 120
tgtccgagat atctaataaa tgttatttgc tcaag 155

<210> 944
<211> 285
<212> DNA
<213> Homo sapiens

<400> 944
gatcccagtg acattttact gcaacaaaac caaactgtat gaagttaagc cctgtctcca 60
ggaggcatga aaccacctcc acttctcgtg atgctggctt cttctcaaaa caatctcaaa 120
gacagctccc cggatatttt gaaaattcag cttctgtttt tctgagaaaa atatattaat 180
aacttctgaa ttctctgaca ttgaataaat tgaacaagag tgttagcttt catctactgg 240
gaaatattca aagctaagtc tactaaattg aataaaactt ttaat 285

<210> 945
<211> 442

<212> DNA
<213> Homo sapiens

<400> 945
ctccattgct gactggcttt aatggaaaga gtatttttgg tcctgttttt gaggtttggg 60
acagtaacaa gaaaagaagc aatttttaca tttaaatggg atgagaagtt caacacaaat 120
atctgtagca acaaggaaac atctcgaaaa attcttatta aaatttatac ttaccgttga 180
aactacagac atatgacaac tcaaaaataa acccaatttg gacgtggaat gtttctttca 240
agggtcaagc atcctgttct ggttcatttt gatgaagcct atctacataa aattggaaga 300
ggcttgaaga tcttttggtg tcagtttcct catgtttaca gtagtaggag gctacagata 360
tctctaaaat acttctgttc taaaagactc tgcaatttta aatggggata tattttatcc 420
aaacatggta atgcctttgc ca 442

<210> 946
<211> 670
<212> DNA
<213> Homo sapiens

<400> 946
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tggganggggg taattaantt ttaaagtttt cttttaacca ttgggaaaat tgggaccaag 120
gggaaaaagg gaaaaaancc aaaattggga aaaaattttg ggaaaagggg gaaaaagggg 180
gaaaaggaat gggaaaaccg gcctttaaag ggtgggtcca angggcccct cttggaagcc 240
ccccaaagcc taaaaggccc cantccanta atcccccctt ggtggaatcc ttggcaccct 300
taacaccatt cccaaggaat ggggcccttg gaaagttaaa gtggaaaaga atccccccaa 360
aaaagaaagt ggaaaaaaat aagnccnttt aaacctggat ngggcatttc ccnccatttt 420
gggggaattt ggttttttg ccctcaccct taactggaat cnaatggtan cttttggaaa 480
atctcccgca cccttaaaaa aangttcttt ttgttaattt cttccccacc ctttgaanaa 540
tgtacntttt gggaanatcc accctntgcc cggcaaaaca attggntntt taactccacc 600
gcctntccca aaaccttata agaagctaat gatantcccc cccccctttg ntggacctcc 660
tttttggga 670

<210> 947
<211> 315
<212> DNA
<213> Homo sapiens

<400> 947
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aagatgttga agttgaagat gacctttctc ttcacaaggt cttcataaag aaataataag 120
tctaataaat ttaacgatgt gtgatcatat tctaaaatga aataacagtt ttagattttt 180
gaatgaaata ggtaaaatgg agcaaatcac tttagagttc tgcattctga agaacacaac 240
caatctcctt acctgnggng natcaaagat aatattcctc aacngtatta aaccaattta 300
ttgccaggct ctgtc 315

<210> 948
<211> 495

<212> DNA
<213> Homo sapiens

<400> 948
ctctcaaccc gtctcccctc ttccccatta tggactgaag gtttctgtcc ttccaaagtt 60
cacaagatgg aaattttaac cccattgtga tgacattaga agataacgag atgatgatca 120
tactgtaaaa gcccattcaa nganggtnaa aagnagcnac cctnnacncc ccaggaagan 180
cnnctggnac natcatcaac acagaagatg acttctgtgg ccaaatgtgt gggagttttt 240
caccactcac caagcagcaa gacaccaagc tgggtgtcct ccaattcact gtgacactgt 300
ctacccggag atctgtcata tcgcacaggg tgaanactca attnccaaac tcccccccac 360
cngagcaaat cccacctntg ggnattttng cccccncttt aaaatgggtt tttaaanccc 420
attnggggtt ggttaattgg tggggccnct tccnaattta aggaaaccct ttctggtttt 480
tttaaagggg ggggg 495

<210> 949
<211> 582
<212> DNA
<213> Homo sapiens

<400> 949
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ctgttcgggc cgagctccgg ttccctccga gagcggnttg caaatttctc ctaatgtggg 120
agactggtgc accaggccaa gtggnccccа cttncccttt ttcaaggact ggtgnaaacc 180
aaatgggaat ttgcccccga aaagtgggct cccggggggc ccttgagaag ggatcaagct 240
gaggaagctg caaaagcttn gttaacaagg aaggggcacc aggccccgtg gttgtgggcc 300
ggaaacaaaa gccaacctgc tttggtcntc ttggcaanaa attggaattg cccngggntt 360
cnaaaaaaat ccgnaaaccc caccttgggg gggccntttt taaaaaaaaa ataaaaaacc 420
ccaaaccggc ntttgcccnt ntaaaaaaac ccccaacctt ttggcgnaaa aaaaaaggga 480
aattttgggg ttgtnaaaaa tttttntttt tggnaaanct tttcnngggg naanaaancc 540
cttttgaaaa aaaancaann tttttgggnc tttggcccaa aa 582

<210> 950
<211> 500
<212> DNA
<213> Homo sapiens

<400> 950
aacaaagcat caggtcaagt acccaaggcc acaaggtgaa gaagttggag tcaccaggtt 60
cattctgact gtaaagcctc accacatcac tagcaggaga agatggagaa gcatcatnat 120
ntgacncntg atgaancaaa aaattggnct ttttnaaaan ngcngncccc anaatcttca 180
caagccatcc tgaccatctt gcaagagtgt caggagattt cactgggttt cttgtgatta 240
tattcagaga ttcttgtgat gacattggtg gggacttcag ttggaatcac tgntattctt 300
atccactttc cctggatggn ccctcagttn cttanccaag gtanaancca anaaggcang 360
ggttacagaa taaaagtgct ntgggaatgc anaaagatat nctactctgc ctgaaggana 420
anaaggcttc tcactnttaa ttgggcnttt tancccaaac agncccttgg gagnggggaa 480
naaaacctga gggggcattt 500

<210> 951
<211> 503
<212> DNA
<213> Homo sapiens

<400> 951
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tctagccaag gctgacacat aaggaagatt ttaggatgac tttgttgaat ggatagagaa 120
ggaggaagag catggtatat ggggtctctg ttaccctgaa tggtgaattt cagctgatgt 180
tgtaaccaga tgccaccttc tctttttcat gattagataa cacatagatt acccacctac 240
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tttgaaactt ggcaagttca cttgacctga gaagttaagt gctgctggaa ccccagctga 420
acacattgtc ctgggaanan aaaaacnntt ngcncctntn tccttccttg catagaaagg 480
gtaaatttgn ttacagcttt ccc 503

<210> 952
<211> 481
<212> DNA
<213> Homo sapiens

<400> 952
agttaaaaat ctgcggtttt taattgcacc tgaggatgcc cccctgctct gttcctagct 60
ggtgttcgac aggcggaacg gaaggattga agagctgacc acaatacctc ccaagccact 120
gtgcttctta cagcatggcg ccaataccg tccctttgag aagtggagtc tttgttccct 180
tcccttgagt tttggcagga ctctgactat gtcagaggta aatttatgtg acttccgaga 240
ctgggtcatg aaagacaaca ccggttctgc ccagttcctt aaaatgaagg aaggctggca 300
ccatggtgtg aggaagccga aaccacacag aggctgccgt ggatgctcca ccaactgccc 360
actgaggcta acccnccaac atgggcatga aaacatnttt aaaanaantn ttggccccac 420
ccccccgaat ggnagaaaaa ggtttcccaa aaaaaaccac cccnccccc gggactgggg 480
g 481

<210> 953
<211> 507
<212> DNA
<213> Homo sapiens

<400> 953
atattggctc acttactgga tcaaggcagc tacattacaa aaaagaaaat aatttggaca 60
gaatcaagaa gtctattata atgtaggtat ttgaaatcta cctccttgct gaacttggag 120
attgatctac agaagaaaaa tcttagcatc taaaggtctg ttttcaggaa aataaaaatg 180
tctatcaatc taccataaac ctgtctgggt tatcaacaac catcaatgag aagacccagg 240
ggaaaattta gggacagaga gcactgctca gacttcatgt ggaaatggaa agctgagcag 300
tcgcctgggt tgaaagaaca gaatgttctt cactgcactg tcattcagct tccaggaatg 360
ctgcatttca gtgggtatgc ctgtcatcca gccgctaatt cancttgaca aggcccgaac 420
ccaaatcatn ttgaaanccc aanntttcct ttacgggngc cttntgaaac aaaatacttt 480
ccaaaaaaac anacggtttg gtctgga 507

<210> 954
<211> 487
<212> DNA
<213> Homo sapiens

<400> 954
cttccaagca agctaagcaa tgtacgttct ggcaaacgga caccaacatc cacgctgcat 60
taatcatcgg tcccacaaaa taacccaaac aagacccaat gactgactga gagaaagcct 120
caagtctgag atgagacgtc tgccctctac agtctgttgt gcccatactt tctcctacaa 180
caaagcacac ccgtcactag aaggcaggat acactgtact tcttaagatg tgactcagag 240
aattaacaag gattcttcct gcaaggtcaa agatgataaa tatgaatgct aatgtcctgc 300
actcatcagt tactcagtga aagagactac acgtaggtca taaagttcct acttgccata 360
agattaaaca atgggctact ggctttctta tttactgaac atcanaatga aagtcattgt 420
atgggcctgt ntganaaata nnntganagg gtgggttccc aaaaaanccc aaaaaaaaaa 480
agggggc 487

<210> 955
<211> 318
<212> DNA
<213> Homo sapiens

<400> 955
gtgtgcaaaa tctcctccct gggagccaag tggccccctc agccagcaac agtgacaaga 60
agagatggat aaagttgtat caaatgtctg ctgaccttag tgaggggaga cagagccaca 120
taattgtcta cagaaaggat tatccattcc ggtcattgta ctcaaatgct tagaaaattc 180
tgaacattct tcttgcccga gggaaagtac tacgcgatga acagaactat tttggtgtga 240
aatccacctg attttaaatc ctggctttac cataaacaca ttcgctctgt gactttgagt 300
aaattacttg gctttcct 318

<210> 956
<211> 515
<212> DNA
<213> Homo sapiens

<400> 956
gtttttgtgt ggacataagt tttcaactca tttggataaa gaccaaggag agcgattgct 60
ggatcatatg cttcctaccc accaatattg agaaggaagt aaaatggaaa agccaagaaa 120
gaatggtcga atcaggacac catatgtcca ttcctggctt ctactccttt ttataaacac 180
aagagtggaa aggtttggct ttattcgaca cctcaaagag gagatgcagg aggatgagca 240
gtctgcagtg caggaggttg gagacaaaga gaaggtgatg tcacagaaac ctacgggcac 300
atggtccctt ctccaaggtg agaaaacgga ggctcacaga agcataagaa catcatctag 360
acacgcacct ggttagtggc aaagccaagg ccagaacang ctaatangtg gnangacttg 420
ncntttctca aaaaaaaatt ttggcctttg gcctttcnan atgatgctgg aaccaagtta 480
anactttggg aaaccattgg ggaaggcatg actgt 515

<210> 957
<211> 268

<212> DNA
<213> Homo sapiens

<400> 957
cataactgac gatngagaag cantacttca tcatctttgg agaatttacc nacggnccct 60
gngnncccga tccccgnnac actttctnat ggattttgtn acnntttnnt aaagggggaa 120
aaagccnttt gacctgaagg gcttttaggn agaaaaaaca caaccccggc cctcttgtgg 180
tgcagtcttt taacattcac gcngnaccgt gnacccttg gggaacattc atctctattt 240
ttaaaaaaaa tgcttttaag gtatcctc 268

<210> 958
<211> 426
<212> DNA
<213> Homo sapiens

<400> 958
ctgcccacct ctctatggga tgagagactt gagaaattca atttaatcca attcagcaaa 60
cactgagtat ctgctatgtg ccaggtactg acaggtacca gaaataaaga gatcactgtc 120
ctcgaggtct ggtgagaaag acgagcattt ggaagtgctc taacatcagc ataatgacct 180
gaacaaggtg gcacggagct gagaaagaag cggtactttt atttcctcct tctgtacaga 240
gtatataaat atattatgaa cagtatacag aataaatgga ataaagtcaa tacctacttc 300
attgccatcc aggncaaaaa ctggaggttt ttcctatact tnanaagttc cccatgcatc 360
cctttcacaa ttccctcagt ctcctaaaaa cgaactacaa tcctgaccgt ttgtaataat 420
cgcaac 426

<210> 959
<211> 491
<212> DNA
<213> Homo sapiens

<400> 959
cananctnan ntgaacaaac caatgnncgc ttnacccaag nagaatggga annccnantt 60
tnaaattngg aaaactgggc cctttggttt ccttttcaaa angaggttta aagggcagaa 120
gagcccagaa ccactcccaa tggacaggct tttctaagtt tctcctttta aactttaaga 180
gggagtttct tgcactgaga agaactggga atgggcccat cggtcccgga aacatctggg 240
aagaaatccc gtctcattaa agactttcag caaccattgg cctcagggta ctgtgaaagt 300
gaatgctatg tgccttgtaa ggctaggtga caaaaatggn catgcanttt ncaccntgtt 360
tttnttatgg gacgccnctc ttgggaatcc aaccctncca taaagcttac tggnggangg 420
aaaccccata nggaagcccc atggcgggaa aggatcacca tgggggaggg taacccagct 480
taacccaagg g 491

<210> 960
<211> 519
<212> DNA
<213> Homo sapiens

<400> 960

ggncngcctt ttctgntccn tancnaacan gacccccttt ccctttggcc tactttaacc 60
tcttggggan gangcaggaa accccccagcc aaggaaaagc tggccagggg agggaaagaa 120
gaaagccaag ggaaaagggc accccccagaa gaaagaaagg ggcttggggg tccccaagct 180
ccaaaatggt ctcattatct tgtatttgaa tatccccaaa tttgaaaaat tcaaaatctg 240
aaacacttct gatcccaagc atttcaagac tcctaagagt taatacgaag taagaaagaa 300
gaagttggag ttaaagcagc tcgttccaag ttctgatttt gccattttcc tgtctgagtg 360
ganctggagg tattttntgc caggaatgtg canggtttgg ttaccataaa ataaaacatt 420
gtgnccatgg gngggtttgg cttgcaccta tcaaccccat tcactttaag gtanttaaag 480
cccccagcca ttgccattaa ctggttcttc tttgggcct 519

<210> 961
<211> 448
<212> DNA
<213> Homo sapiens

<400> 961
cagatttnat ganaacttac tcactatcat gagaacatgt ntaagggaaa ctgctcccat 60
gattcagtta ccggcncatg gttctgccct tgacacgtgg ggatttntcat gtgtctcacc 120
attcaaggtg cgatttgggt gangacacan anccaaacca tatnacttgc taatgaggaa 180
actgagncag anaggtntag ngatgtaccc aagtctgccc ggncggngag tggcagagcc 240
acgcttntag aggaggacag cccagccccg catcccccgt gcttctccat gtattatgtc 300
cctgcctccc tgtttgctgn tccactggaa tggttnaaca tgcaagcttt ccttccagct 360
gtngngccag nacatggctt ncttcctnct cccgaagcng aatcgcggga agccataggt 420
tcagaagatc ccagctttct ctgctttg 448

<210> 962
<211> 442
<212> DNA
<213> Homo sapiens

<400> 962
cagcagtatc cactatggcc accatctcca tcttccacag aataaggaaa ataaaatatc 60
tacgatagac tttttcctga agtcacccaa ttactaaata actgaggtgt tttcatctgg 120
ataattcatg cttcattatt gggccactat tctctgtctt gggttctccc ttggctcctg 180
tgacaaacat ggggttcaga tccagactcc aggaggtagt gatgcttcaa cttttggtaa 240
catacaggag aaaggccata tgaggaccca gcaagaagtt ggctatacat gggaagagag 300
aactcaccag aaaccaacca tgctggcacc ttgatcgggg gccttccaga ctccagaaat 360
aagaaatcta caggagtaag tcagctaaga attctgttac tgggtcgtag aattcagctc 420
cctccctgtg ggataatgga ca 442

<210> 963
<211> 516
<212> DNA
<213> Homo sapiens

<400> 963
gcgctgggac tccngnncta ctncatntgg gtgggtttng ngggggaaaa aaaggaggng 60

gaaaacacnc cactggaaaa ctggntccca ttggggcctg tcntgcttaa aaaaaggccc 120
agagaggcag tcttgacacc ctagatccca agatctccaa ggatttggtg gcatacccac 180
tccagcacac agaagcatga ggntcatgac tctcctcttc ctgacagctc tggcaggagc 240
cctggtctgt gcctatgatc cagaggccgc ctctgcccca ggatcgggga acccttgcca 300
tgaagcatca agcaagcttn aaaaggaaaa tgcaaggcga aanacccaag ggttngccaa 360
gacaagggcc ccaaaggcca agggaagcag nagantccaa ccctttnttg ggnaaaaaag 420
ggccttatac ggagncaaaa aaagcttgtg gggggggact tcgggaaaaa actaaggaaa 480
aagaatgcca gtngaagatc tagaaaagcg tgggtg 516

<210> 964
<211> 531
<212> DNA
<213> Homo sapiens

<400> 964
gcacagactt ttgccnngcc ntnnnancna acttaaggnt aanaacccan ggngggggcn 60
ngtttnangg ccnntaaang nccccttgc aggtgggaat ggccgcccgg gncttacttt 120
actggtcctc gggtcccgaa gctttcttgg tgggtaaact tgagggaaaa ctggctggct 180
ttaatgaatc taaccagaag ggaatgaata attggcttgt tgccccaagg gacaaccccc 240
acccagtttc acaaagaaaa tcccgtgaaa gaagaagaag catcttcttc aagggtgaaa 300
aacantaaac ccatgaaggc cccttttnct ttggggggttt taccggagaa tgaatggttt 360
tgtnggaaaa ggcantgaca aggtcaaggg ggttaccgtg ccaaanaacn tctgggaacn 420
tcgacttacc ttgaaattga atgccaagcc tcangccatt gggttaaggc ntggaatgcc 480
ccttggggcc aagttattta agtantccca cattgactca agtttgaaaa a 531

<210> 965
<211> 208
<212> DNA
<213> Homo sapiens

<400> 965
gaaaaaaaag aagcctggaa atggatcatc caggactgac ttccaatgat gtcaaaatcc 60
ttagcggttg atttatcacc ttatgggcac aagatggttg ctgctccttt gaggcatgaa 120
gaaggaataa gcaacaaagg atcatgccta aaacatcact gcccaacagc gccacagccc 180
cccaacaata aaccttccct taaatgcc 208

<210> 966
<211> 440
<212> DNA
<213> Homo sapiens

<400> 966
gatctgagga tcataccta atagcgacct aaagtgttca ccactctcat gccgaaaaaa 60
atcatctctc cttggaatag aagatggaga cgatgtcatt ctcatatcaa cagaggaaag 120
tgaaggcgac aaggatcttt ccataacatg tactaattca tgttcttctc tttgctctaa 180
agtatcactc tgttgagaat ttaaaaccag tggaggaggt ggtttaatgt cttcttcttg 240
cttcacctcc actgtaatag caacaggatg gtgatccaac attacctgta gtgaactggt 300

accagcctgt gcctcctcat cccaggttgg cctatnaccc cccaaaaagc attataatat 360
gtaaatcaaa tgaagaaaaa gtgtatattt atagcataat tttaatttaa tgtcattaaa 420
tgataaagct ttaaaactag 440

<210> 967
<211> 466
<212> DNA
<213> Homo sapiens

<400> 967
ggctttccgc ccggggtgaa aacccaaatc aaggtggact gaaagaagaa naaaggttca 60
agaatgaaca gggagtggcc gtncaaaggg taccagacgc ttggagggaa gccatgggaa 120
taaaaaattt tgggcgggcc attctgctgg tcccagaaat aaagaactac atttttccaa 180
gcctcctttt gcagctggac cncgggcatg tgaccccatt ttagggggca tggtaaaatg 240
ggaggccctg tgtggcagct ttttgggaaa ctttcttttt gaagggggcc ctgttanggg 300
gnaacttngg aatttntttt tttggnccac ttttccccac ttccctcatt tttgaanggc 360
ctaaggcctt ttaaatgcaa agctttgggg acccncaaaa gttggaggga cttgcncccc 420
cangggnatg ggcataaggg gtaaagccca nactggtgga cccagt 466

<210> 968
<211> 449
<212> DNA
<213> Homo sapiens

<400> 968
agagcagaga gcatcgatcc ggttcaagac caccctcatg aacacactca tggacgtcct 60
tcgccacagg ccaggatggg tggaagtgaa ggacgaaggg gagtgggatt tctactggtg 120
tgacgtcagc tggctccggg agaacctcga ccacacctac atggatgaac atgtgcggat 180
cagtcacttc cggaaccact atgagctgac ccggaagaac tacatggtga agaacctgaa 240
gcggttccgg aagcagctgg agccgtgagg caggaaagct ggaggcagcc aagtgtgact 300
tcttccccaa aacctttgag atgcctttgc gaagtaccac cttgtttgta gaaggagttt 360
cgcaaaaacc caggaatcac ctggatcatg aagcctgaca caagaagctc tgacgaccag 420
aaagatgata ttnccggtgg agaactatg 449

<210> 969
<211> 459
<212> DNA
<213> Homo sapiens

<400> 969
atcacaaatg ccccaactgg gtaactgtca gaacccaaca ccatcaacgc tctgcagaaa 60
gtaagggggt gagtgaagat gaaaatggag caagaaagag aacttagcat gatgactgca 120
caccctcagt gaatggcagg cctaagggga gaaatttagg cctgtcccac ctcacagtga 180
aaaaactcaa tggttcctga gactcatact ccctcctctc cactgtgtag gaggctccca 240
ggacacatga cagtgaaaag attgaggcag tcagagggaa acttcgtcta gccccaacac 300
aggcagagat ggtaggagct ncccccttccc aacaaggctg aaaggtcgca tggccncccct 360
gaagctcana atccacagat gatcaagtga aggatgacag aagcaatctg gattatgcaa 420

agaattgctc tgaaatatga aagatgattt taaagcctg 459

<210> 970
<211> 441
<212> DNA
<213> Homo sapiens

<400> 970
gttcttactt gaaactgatt taacatatta aggaaaggga tcaattgaaa gaatggtggg 60
tagctcacag atgactggga agtctgcttt ggatgcctgc tggaacaatg gaggttgaga 120
aacagctagg accccagctg aaatcatgcc tgtctggtgg agcattaaca tgcttccaga 180
agtcaaaact atataaagga tatactccga gaagtattcc tcccttctgt acccactcca 240
tcttgttcct cctagccagc tcttgaagag gcggaaattc actctaaaca ggagaagcag 300
caatgagaac ttcaagaaga gatataagcc tcatccaana tcacctgcag aggaggacga 360
gggaaatttt atatgggaac aattatctga aaaatagaat gtcctcattt gtatgggcaa 420
ggctgggttg caaagaagtc c 441

<210> 971
<211> 442
<212> DNA
<213> Homo sapiens

<400> 971
atacgtgaaa ttccggtaat aagggacaaa atggttaagc tcttgatttg agactaagga 60
tggagatggg gccatttaga atgcccagat tcaagaggca agtagaaagg agagttgacg 120
aagggtcccg agcagggaca gctggaaaag cagagctggt ggaacttgga gagctgtggc 180
ttcctgtggt tgttgaaggt gacggtcatc ttgatcctgg ctgggcagtg ctggagcagc 240
ttccccacct ggggatctca ctggctatcc ttctcctcaa cttggatgtt tagntggctt 300
tttatttctt tggttattgg tgctattggc tttggttggg gggttaattt cttattttgg 360
gacttttagc acataaagtt ggagataatg aatgggaaca gaatgggaaa gagtggatat 420
aatgatacac cacataccct cc 442

<210> 972
<211> 440
<212> DNA
<213> Homo sapiens

<400> 972
agttttcgaa gaactccagg aagtggctgc agagcaaagt aggatcctga tactgagctc 60
aagtgattca gaatgaaaag accttggcac agacctgtta aggaagctcc atataagggc 120
caccggggtt ggctgagtca gaataccagc catgtggcat gtcgcatggg gcaagagctg 180
tgctgcccat gggagtccag agaaggagca cactaaggac caacaccagc atttgctcta 240
ggggaagcct gcagctatgt catgaggacc ctcaacagcc ctgtgcagag gactatgtgg 300
catgaaagat gcctttttgc cacaaaccag ccccacttgc caagcatgtg aacaagctaa 360
actgaaagca gatcttcagc cccaatcaag ccttcagatg acagtaacct cagccaatat 420
actgactata acctcataaa 440

<210> 973
<211> 426
<212> DNA
<213> Homo sapiens

<400> 973
actcttttgt gttaggtttc ctgacaatga aagagatact agaatcaatg aagaactacc 60
atgatctcca cagcatcccc tcctcgtgga tgggggacaa cgagatggtt gctttcccag 120
agctcctgtg gaggactgtg aagatggtga ctgcccctca atgtatcatc ttcacaaaca 180
tttccttggt gtctgcagag ctgaagacac tcattggtcg tcctttctgg gaatgcactt 240
ggagataatc cccatcaagc gcattttcat cgcaactgag tctagtgcag gcatcaaatt 300
ctgagcaacg ggactattaa ggcagccacc atttttnttc aggttcagng caatcaccaa 360
tatggtcact gaccaagtcc atcatcttga gtccctccaa cagctgcaag ttcctgttct 420
tgcctc 426

<210> 974
<211> 426
<212> DNA
<213> Homo sapiens

<400> 974
ctttcatagg tcactacaat ccagtgccaa cacagcattg ggtggatccc atgagatttc 60
aaattccaca aagaaaaaat ctacttggtc ctcaacatta cttccaagat tgctggagtt 120
cactgtacca ataaaaactc atggacaaga aaacagaaac tagaagtgaa ggacttcaat 180
atccaagaag atggtgtagc ctcaagatag aaaaagccca cacttctgaa acatcatttg 240
aaaggctgct gaagacctgc atcacatgag gttatcaaac tacagcccac agaccaaatc 300
cagcccacca tctnttttga agggcaggtt gccncatcat gaggatatca agacatccta 360
tggtgaggcc tgtgtgacag gaaactgagg cctcctgcca aaagccctgc gaatgagcca 420
tcgagg 426

<210> 975
<211> 427
<212> DNA
<213> Homo sapiens

<400> 975
gtgcccagac actgcttcag gagcctgagg aacgcagtgg cttttctatc atgacctgac 60
ctgggcttct cagcatgaag acagagctgc attcctggga tttctaagaa gaaaagaaga 120
ttctgtcaag cctgtgttca atcaaaatat cctcccctac atgactgccc cccactccct 180
gccgcaccac ctttcttttt ctgttttttt attgctgtta atgtttaaca tgaaaataag 240
aatgatgtaa cccaggatcc agaagccaat acaaactcaa agcaatttga gtttttaact 300
ttgccctatt tcattggggg ggaaaccaag gtcattaagc atgactttgg caagcacatc 360
aagtgtgtca acacatctta aattacagct gtcaattagt tacctgaaga cttaatatgc 420
caagctc 427

<210> 976
<211> 439

<212> DNA
<213> Homo sapiens

<400> 976
gtggggtctt tcactgggat ggcctgtcaa ggagcaaacg agatcagatc agagagaaca 60
ggagaaagag ctctgtgcat gtggcttgct gtacatgatt tacaaatga aactcttcac 120
actgaacctg ggttcatcct tggagcaata tatgaaagaa aacagaaaac agccacagga 180
gcctggaggg acagaggagc tggtcgcttt gtggaccact gtacacctga gaaaggtgac 240
tcttgaaagg aaaagaggtt gcttgacgta ccctttgaag ttcacgggca ctgcaaagaa 300
tgcatttttg tagcttgatc caccttnaaa tgcccanatt catccacatc tgcagcttat 360
gtcacagggc tggcagctaa cagaaaccat cagatctgcc tttgttttct tatcaaatca 420
tatgtgataa tgtcacaac 439

<210> 977
<211> 443
<212> DNA
<213> Homo sapiens

<400> 977
aaaagtttgc tgacgcctga tatggagcac tagaaagaaa ttatttttcc aagcatcaac 60
ccggaagtcc cagcataccg agggtggcag acatcatttc ttcaatgaac ttagtattta 120
gaaagatatc ttcactccaa gcatcaagtc ttttctgtcc tgcaaaagtc ttaagtcaaa 180
ccagaatcca ctagtagagg gcacctttgg attcaacagt aaaaggagaa tctacaaaac 240
cagctcatca aaaggatatt gaatgaagct atgatacctg tagcagttac tgccattttg 300
gacccataaa ctgacaatcc tttaacaatt accaggaggg cagagcggaa agaacattga 360
tgtcatcact gagttgctgg attaccttac tctagaaata gccaactctg catgnttggg 420
tattttttta aaaagtcttc ccc 443

<210> 978
<211> 433
<212> DNA
<213> Homo sapiens

<400> 978
acacagagtc tcactctgtt gcccaggctg gggtacagtg ctgcaacgtt gtccaagatg 60
tctggaactc ctggcctcaa gcagtcctgc agtcttagcc tcccaaatct cttggattat 120
aggagggagc caccatgccc agccctgcag ttctttttaa tacatcgatg gtgcttacat 180
ttggcactga attgttctgc cattatggtt tgcatgaagg agaagaaaaa tctccttgaa 240
cacacggtta aattgataaa tttgaaaaga tcatatggag ttgcaagcac tctattgata 300
actacttatt tgngntttaa caactatttt ccatgactnt cctaccttct ttttccaagt 360
caatttctta aatgaccagg acatcataca ccataatccc catatacaca aataacaaat 420
aaacgttctt tta 433

<210> 979
<211> 386
<212> DNA
<213> Homo sapiens

<400> 979
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aaataaaccc tatcgacgtt accgaactgc cgggcaaaac cagagcaact cacttacttg 120
gaaggtgaaa aacacttcaa catactccag gcggcaaccg acacttaggg gccaggcaga 180
tgaaacacca tttgtttaaa aagtctatta tttcactgtc tcttcaacaa agggggaaaa 240
ctgagtgatt aaacactgag ataatgcccc ccttactaaa cctatgattc actaataagc 300
agggtcaatg gccattcata aactttaaag aaaggaatta ccgaagcccc ttgcttnaca 360
aaattccccc aagaaacaga aagagc 386

<210> 980
<211> 260
<212> DNA
<213> Homo sapiens

<400> 980
actgaaaggc agagcaatga gaagcagaac tgcagagaca aggattccag gtgcttggaa 60
gtgagggtgg agccagcccg ggaaaagatt cagccccaga cggctgcacc aggtggagca 120
aagatgtctt ctcttttata catgtcaact agaaggtgac aagagacagg agccccatgat 180
cttaaagctc cctgtgttac ccagcacccc tgtaagattt cctaatcatt cttttataat 240
taaaaaaaag atattttcat 260

<210> 981
<211> 426
<212> DNA
<213> Homo sapiens

<400> 981
ctttatacaa ttattcccaa atcttctaaa ctgacagtga gggagagtaa tttgaaagga 60
ctgctcaact caacgtcatt tgaagatttg caccacagct gcatttttcc aatttcctgg 120
catctattct gctctcctgg actttcaaa aacaattgta agtggatgaa taaatataat 180
aactgattcc attgatactc ttagaccatc ctttggactt tctgcttttg gacattttac 240
agtttaaaat ttatttatca tctatcgatg tttcccaaag aaggactcaa agtacacatt 300
gtcaaagatc tcatggatct aantaagggc cggggaacca ggtncagaat catacattgn 360
ctctacacag aggggataat ttctgaagga aagaagaaag taaattcctt aatcaccctt 420
ctggcc 426

<210> 982
<211> 440
<212> DNA
<213> Homo sapiens

<400> 982
gtcctcaaca agttttccct tctcaccgta cagcctgtat ttctggtgac actgtgtccc 60
cagaacccta ccctgcctcc tgagaagctt gactggtgag gagcagggct gacttctgct 120
taggcccagg aacatccaga cccagcactg cctacttctg gattattggg gcagacatgg 180
ctgctggatg ccatgtgcat gtgcagaaca tcagcaaatg gacacagtga tcctgaattg 240
tatgcccgta tgcagcggat cacctctagc cagcacagca cttcaactga caagcccaga 300

taccacccac agtcaccaac atgcagaaaa ctttgcttta acatgggaga gacgggtctc 360
catgttttgn ctttaagccc ctttcctgaa catcaccacc tggagcctac attctgngct 420
gnattggctc cctgtaaggt 440

<210> 983
<211> 439
<212> DNA
<213> Homo sapiens

<400> 983
tgctgtgaca gtgtcttaag tagggcatgt tgatagatgg aaaaggacgg caaactcgag 60
gtgctgattc aggaagaagc agattccaag atggaagaga aaatatcgag agaaatatgc 120
cgagagaaga atccaggcag aatggaatcc aggcagaatg gtgaatggaa ggttcgggtg 180
accaagagaa aggaagggtg actcagcaag tctgtagttt cagctcttgt atagtaccgt 240
tatacttgaa aagctgaagc cttttctcgg ggaagagtca gaacggcctg gagggcttgc 300
taaagcgctg ctggcttggc ccccncccgc tgaatgacta atggagactn tgagggccgg 360
ctggtaattt gagtttctaa caagccctgt ttcgatgctg gtacagccga tctanggaaa 420
atattggaac aaggaaaaa 439

<210> 984
<211> 439
<212> DNA
<213> Homo sapiens

<400> 984
tccggngcca cttttatcta ctggaggtcc ccctgccaca tggcctcatc caaagcagtt 60
tgcttcttca aagtcagcag catcaattgc tctacaattt ggagatatca gacgaacaga 120
gggaaaatgc agtcagtggt ctaaagctgc cccttaggaa atctaaggct atatctggtt 180
ccataaagtc tttgatcant cagtcanaac aactgcagca ttcctgccgc tcagaatacc 240
ttaatggcct tagtagctga ggtcctcaca gcactggcaa gagcaacatg gcattggaat 300
gggaggactg aacaagacgg aagaaaccca agactctntg gtcattgcag aaggaagaat 360
gagagcccaa gcctgaggaa gataaaatga gatgatttgg cttaatatga attaaggcag 420
ctgncagtgg ttctgtaaa 439

<210> 985
<211> 444
<212> DNA
<213> Homo sapiens

<400> 985
ggcacctggt tttgtgtaga tacaactcag ggaattatct ccacactgca tctgccatga 60
tcacctgtga gcacctcctc ctgaaacccg ncttcacgtc accttttacc aggccgaccc 120
tacttttctc catctgctaa gaagtgcagc tctaccactg gaagcatcca cttcggtctc 180
actcccatcc ctagtgctaa aggactctct aagagagaat gtcagcacag ttttgacaga 240
aacactctaa aactcctgga tattccagaa aaattaactc tgggcaaaag aacattggca 300
tcaaagnaaa gctcaattta tacaccatta gccanttttt gatagctata aacctgacac 360
gcaaatagga atattttatg gcataacact accgtttaca ttaaagtgct ttttaataga 420

atatgtaatt tagaaatata aaag 444

<210> 986
<211> 442
<212> DNA
<213> Homo sapiens

<400> 986
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gatgatcata aggacacaag ataaggaaat ccaatcagtt gctacgtgct gatgattctg 120
attctggccc tgcagtatcg cttgcatgca cctcctcctc cctgtgctca ctgctggaga 180
aaagagaacc ttggctgatg atttatggat ctacaagtaa tcgaagctta actgccacaa 240
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acttggttgc tcaggtggaa ggcatataaa attgnattgn atttgaataa gctccccagg 360
tagcacagta atgtctctgc acttgattaa ataagtcagg tcaatttttc tgcaagtttt 420
cctccattgc agcactaaca tt 442

<210> 987
<211> 219
<212> DNA
<213> Homo sapiens

<400> 987
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attatccagt gacatatatg ttaaaaaact atgacatttg aacccctatt aatcataaaa 120
ctgttcatct tttgaaaagg agaatgattc tttgtaaatt caaactccat ctgtattatc 180
aataagagta tctcagattg agtttcacac atcgaaact 219

<210> 988
<211> 178
<212> DNA
<213> Homo sapiens

<400> 988
gaattctcca gggacttatc agagttgctg gaagaaaaca gctgaggatt gagcacagtg 60
aactaatttc ctcacatctt tgaataagca gaagttggtg aaaaggaatg taaatattct 120
tatggtaaaa tgagttcaaa aagaatcctt aaatccttaa aattaataaa ccaataaa 178

<210> 989
<211> 536
<212> DNA
<213> Homo sapiens

<400> 989
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agcatctgcc agagtctacc ttcctcactt ctaccctcca ttcccaaaga gcaagaaggt 120
ggatatgtgc cagaaaaagg ctagagatcc tttacctcag tcttttaatt tttaatcatt 180

ggaaagagaa ggaatgagtt acaggagaaa gaataatgga tttgctgtca gaaaccaaga 240
tgaagtctga ttctgccact aatcactctg tgactttgaa ccactcacca aaatggatta 300
atctcataaa acttcgatat cctcatcagt aaagcaaaat agcacacttg tttactgtga 360
ggtgcaaaat tcgtcaaatg cctttataaa ccacatggtg ccctgtgaat gtaaacagta 420
tgatgtggat tcctctaaca ctgatggcga agtggcactg aaagggcttc ttaagcttca 480
taaacgccta cacaaaaacc ggncattatg ccctcctttt ncctaaaaag tcttca 536

<210> 990
<211> 270
<212> DNA
<213> Homo sapiens

<400> 990
gggaatactg cgaaggagca aactgcagct tgcctggaaa cttgcagcaa gccataccaa 60
ctccaaagtt gaaaattaac aatagaggtc agcctaaaaa agcaatgttt ttcccactac 120
tatctattat aaactgtgct ggatataatc acctttgggg aatgaaaatg tttccccaca 180
ctatgtaatt aaagacgaag gggaagagga ggaaaggaga aggggagaaa gtatatacca 240
aaagaccaat aaaatgcttt caaggagatt 270

<210> 991
<211> 286
<212> DNA
<213> Homo sapiens

<400> 991
nagccaaggt atacccatgc tgggccatcc tccctcaatt aaatgcagtt gtgcaaacca 60
ggaaggagag aggagcatgc gnctgactgc acgcggttaa cacactgcgg cgcccccaga 120
aacagtcctc ctgcagcagg tgcctcagaa atgagcttct ctctccaggc tcatgctctg 180
acacttgact ttctcagctg taagatggga ataacagtgg cgccttccat gtagatatat 240
gttagggttg atgagatggc gtctggcata aaatcaatgc tcaagg 286

<210> 992
<211> 137
<212> DNA
<213> Homo sapiens

<400> 992
ncagtgttaa cgtaaaccaa gagccccaca agaagtcatt aaagctgtgc tgttaagagg 60
ccagagcnct ataaaatagg cnagaaacan ggncttgaga aacatgctgc tgtcctcaaa 120
aacaaccttg caaacac 137

<210> 993
<211> 430
<212> DNA
<213> Homo sapiens

<400> 993

tttnaggatc tgaagctgag ggaattctac tgtgagggaa acccactgtt cctgcagcag 60
ccagtgattt ctacacagca ggagaacgtc tggagtctac aggaaataac atcaagattt 120
gtaatgaatc agctagcaga aaataaccct ttcctaatgg atgacataga acggtaccca 180
caagtcagga gcatgatctc tcagggaaaa acatgtgcaa tatgtggaca gtactttata 240
accgtatggc tggaatgtgt tcgatttgtt cctccaccaa aggactggaa gataagcaag 300
aatctgaagc tggtgcctct ccaagtatta atttgttctt acaaatgttt tactcaacgt 360
gaccctaacc tctttggaat tgctcangtg tagaacaggt gaggtgctca ttcatagcct 420
cactccactt 430

<210> 994
<211> 67
<212> DNA
<213> Homo sapiens

<400> 994
gaagtgtaaa aggatacgaa atatttcttg catgatgtcc tagcaagaat tcttacacct 60
agtttgc 67

<210> 995
<211> 309
<212> DNA
<213> Homo sapiens

<400> 995
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atctggaagg ccaagctgct ctctgcatcc tcttatcact ggtaaccact tcaagtcctt 120
tatgtataga atgctccagg ggggtgggtc tggcactcat ctctttattc cacaatctcc 180
actggacaca ggtcatgttt tagaaacatt tctctttaaa tcagtccttt acttgattgg 240
agacagacag gaaggaagta cacacctgca ctttcaataa aaggaagaaa ataaaagtgc 300
ttaacattc 309

<210> 996
<211> 447
<212> DNA
<213> Homo sapiens

<400> 996
atttagtcaa tgggaacccc ttcaagttgg ctcttttgtc tttttggcat gtcccatcat 60
atttggagtc ttaagaattt acatcttggt tatctgcttt cggcattcca ctctcctagc 120
gacggcttca ggaagtgatg gatactcctg cagaagcaga tctctgcccc tggacagatg 180
gggaaaggct actgggaagg cagttagtgt ctgctgcagt gcacacaaaa atgggaagca 240
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gacaggattg tatcaatagg tattggttcc taataaacat cttgcacctc aaattccatc 360
ccagaatctg cttccagaga accccatcta taccaagacc ctgatgatcc cagtcatctc 420
aagttattcc tgctgaagtt ccactct 447

<210> 997

<211> 373
<212> DNA
<213> Homo sapiens

<400> 997
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gcacgtgacc agcattctca tttcccactc acattcggat ctcggctctc aggctacatt 120
ctggtcagga tgaattacat gtataattca aaatcaagaa agctgttcaa gtacaacgtg 180
tgaggcttct gccaacgtcg aaattcatta ggaaccatga ttttggctga gcacatggct 240
ctgttttgag ctcttttatt ccggtgttat tgctcattca cttaaagnga aatacgtgag 300
tcagagacaa gatctctttc ccttttcatg tttctccaat ttatctccct tggcataata 360
aatatctcaa gcc 373

<210> 998
<211> 432
<212> DNA
<213> Homo sapiens

<400> 998
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ctccactgaa gaaggaattc atgaatttta caagtataat caaagaccac caagaaattt 120
ttacttttc cttcaaaagc taagtgtagt gtagcacccc ctgcccatag tctaagttac 180
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tacaaggttg atatgccgta tgttacagaa acatagtttc ccaaggatgt ggaacatgta 360
gtatagataa atgtaaaaga ctgatcaact gcctttgttc tcgcttgtgt aagtagactt 420
catgaatcac ag 432

<210> 999
<211> 300
<212> DNA
<213> Homo sapiens

<400> 999
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acgtaccttc cacacagcga cagccctctt gcagcacccg tgcatacata tccactttgg 120
actgagaaag gagctggtct ccagtcagct caagccacgt gacctgtttc ctcccacttc 180
accttctacc atgagtaaaa gctccctcca gcctccccag agaagccaag cagatgctgg 240
caccatgctt ctggtacaac ctgtagaatg tgagccaatt aaaactcttc tttataaatt 300

<210> 1000
<211> 307
<212> DNA
<213> Homo sapiens

<400> 1000
aggctgtaca tgctgcctcc ttggtcctat gaaggtgcca cgaacacaac aagctacacc 60

agggaagaac tggagtgtat gttccttatg atacacttga aagcccaact gcagggaacc 120
tgaacacatg gatctgcatg ctagtgaaac actgcacgct ttatattgca catttctagt 180
ggaaaatact atgactgtac ctggcaatat tttcataaat attatcctgg aattccattc 240
atattcttag aaaataattt agcaggagca aaaaaaaatg aataaataaa tagccatgtt 300
caaaaac 307

<210> 1001
<211> 285
<212> DNA
<213> Homo sapiens

<400> 1001
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ttacaatgca aattgaattc ccaaccttgc agaccatctg ccgttaaaag tgagggcata 120
gattgggaag gaattctgcc tttggactcc gatgccaaca tcagctcttc cttggttctc 180
cagtctgtgg cctgatctgc agatttcaga cttgccatcc ccacaatcgt gtgagttgat 240
tccttaaata taattcttta aaataaatct tcccctttc tctac 285

<210> 1002
<211> 73
<212> DNA
<213> Homo sapiens

<400> 1002
gtggggtctt tcacagtgag tcgagatcat gccactgcac tccagcctgg gtgacaaagc 60
gggattctgt ttc 73

<210> 1003
<211> 277
<212> DNA
<213> Homo sapiens

<400> 1003
gctcaactcc gaatggattg gattgcgagt ctgcacgtga gaaaaccgtt tggcttggct 60
tggacccctg ccgcccccca cctcctccac acacacccag tccaggggtc ccctttatca 120
ccctttgctt gcaactccaa aagaagttgc ccacctcctg agtcacaaca caaggtcgaa 180
taattcctct agatgaaaga tcagtttcat ttcaaaacga gaataggttc cttttttat 240
tttctccaca tggtacaaaa taaacagaat ttgcttt 277

<210> 1004
<211> 445
<212> DNA
<213> Homo sapiens

<400> 1004
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gcatagaaac tctcctgatg ttgctcccag accgtgaccc gtgctggcaa agcttctatt 120

cccatgtggc tgcatgtttc ataaggagag ctactaaaat gcaggaaagc acanaggctt 180
aatngctnag ctagatgggc actcagccaa caccgctgtt agcanaatga anctcaatct 240
tacanaataa gtgctgaacc tcggctctgg atcgcccnag ccccacatgg attgcgtgtg 300
tnnncggggg angannttgg atatggnagn ctttcttttc actcttttga aagggnntgg 360
naatctatgg gttactagaa cattttattc ttaatataat aatcccagct gcaaaacaac 420
attaagaggg aacactgcac ctatc 445

<210> 1005
<211> 115
<212> DNA
<213> Homo sapiens

<400> 1005
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atggagattg tattctgatg gggagagaca aaaataaata aggaaaatat gtggt 115

<210> 1006
<211> 180
<212> DNA
<213> Homo sapiens

<400> 1006
gcctggatca gctcaattac ttgcctactc tggacctgag cagctgtgga taaaaacaac 60
tggagaaaat cactcaacag acagactcaa tttactttaa aatatgtgat ttcaaacctc 120
aaatgtccaa ctcctggcaa ctgcactata ttccctaata aacttgcttt cccaaactcc 180

<210> 1007
<211> 393
<212> DNA
<213> Homo sapiens

<400> 1007
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gaagataaac agcatcccac agtcaatctt actcacggga gttaacccta tcgaccgcat 120
gtgcacaaga ccagacgaat gaccaacctt taccccttgc ctcatcataa tactaaaatc 180
cccacccggg aagggacttt gctgccattt tgtgatcctg cggtgcgggt actaacctgc 240
ttgctcactg cacctgtgcg ccctgcgctc cactctgcac atgtcacgac actcacatag 300
ctcatgtaga tgcctgtcaa ccttcctaga aacaccagac ataccctggg gagccagcca 360
gagaactctc cctccagtgc tgtatccctt agc 393

<210> 1008
<211> 431
<212> DNA
<213> Homo sapiens

<400> 1008
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aagaagccaa ctctgcctcc caggataatc taccaccata acatggtgac ctagcatgct 120
gcagaagaag aaaaaaacca acaaaataca tgtacaaacc aaaatatagt catagaattg 180
tgtgagagaa gaatggaaaa gacttacttt cacatccgga aggtcctgtt acaattccaa 240
cttttctttg tacctgtgta aatgtaagca ggaatgattt tgttttgcta caaattcacc 300
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